Nature Magazine

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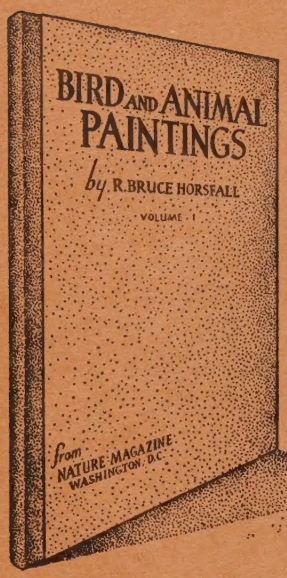

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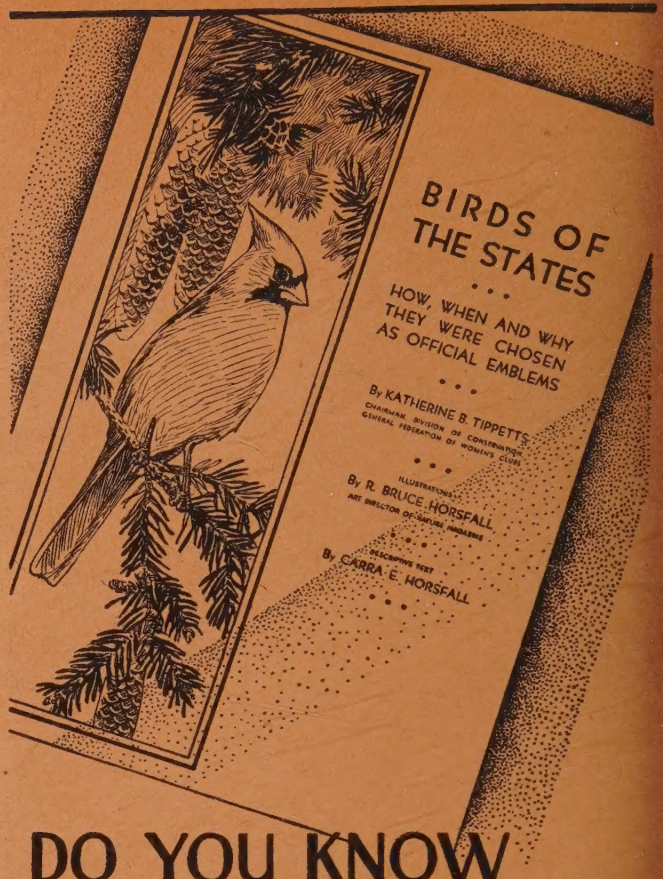
BIRDS OF THE STATES
HOW, WHEN AND WHY THEY WERE CHOSEN AS OFFICIAL EMBLEMS
By KATHERINE B. TIPPETTS
By R. BRUCE HORSFALL
By CARRA E. HORSFALL

DO YOU KNOW The Bird of Your State?

or of the 42 other states that have adopted official birds?

The movement to select an official bird emblem for every state only recently was launched as a nation-wide movement. Some of course had adopted official birds earlier. Altogether, 43 states have now selected a bird to represent them as an emblem.

The fascinating story of how, when and why the various states selected the birds to represent them is told in this book by Katherine B. Tippetts, former Chairman of Conservation, General Federation of Women's Clubs. Illustrating the book are 30 full color paintings of the various birds by R. Bruce Horsfall, the famous wild life painter, with descriptive text by Carra E. Horsfall.

Every home and every school should have this book. It is a fascinating bit of history combined with an authentic and interesting survey of the birds of America. A handy table in the front lists the birds together with the official flowers of the states.

The 16-page book, with 30 illustrations, is offered to readers of Nature Magazine at 25 cents a copy. On orders for ten or more copies, the price is 10 cents a copy.

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Camera Trails

BY NORRIS W. HARKNESS

Printing Helps the Picture

A surprising proportion of the pictures entered in our contest failed to lure the judges because they needed a bit more manipulation in the printing. The subject matter was interesting and well handled, and the negatives—as well as they could be judged from the prints alone—evidently were well exposed and properly developed, but almost every entry was a "straight" print. By "straight" we mean that the negative was inserted in the printing frame, or the carrier of the enlarger, the exposure was determined, and the whole picture area received just that exposure with no other attention to any part.

In some extremely fortunate cases this procedure is sufficient, but most negatives will produce better pictures if the exposure is varied in different places. The sky may need more exposure to darken it enough to make the clouds stand out more prominently, or the corners or the foreground may make the composition stronger if they are printed to a darker tone. On the other hand, one area may be more impressive if it is a little lighter than its surroundings.

Such alteration of the tones is simple to accomplish, but it requires care and discrimination if we are to avoid giving the picture an unnatural look. Too much darkening of the sky is likely to give it a stormy appearance that may not be in keeping with the remainder of the print, and too much holding back of the exposure in any area has a tendency to cause questions in the mind of the observer. However, we can use the control of printing time carefully and darken the edges and lower section of the picture enough to concentrate attention on the center area without making them so dark as to be unpleasant.

A good rule to follow is to change the values in the print as little as possible, and usually a bit less than we think is really needed as we see it by the light of the safelight. Examination of the print in the same illumination that will ordinarily be used to view the finished picture will show us whether we have carried the control far enough or too far. Indeed, using the final viewing light while we determine the correctness of what we have done is always best, whether we are checking a test strip, deciding on the right grade of paper to use, or judging the desirable amount of tonal correction. The print that looks well by the amber or red safelight usually is too light in tone when it is finished.

One more point before we see how to make these changes. The interest of the observer is held by, or rather attracted to, the brightest part of the picture unless it is a high key print that is all light in tone except for the most important area. It behooves us, then, to keep all the less important things darker than the central interest if we wish to avoid distracting the attention of the observer. In a shot of a flower

"MILKWEED PODS"—PRIZE PICTURE BY WILLIAM H. BARD

in its natural setting a background leaf, or another flower that is not really part of the picture but is brightly illuminated, will make a light spot in the print that will pull our eyes away from the main flower and lessen its effectiveness.

The cure for such a thing is, of course, to notice it before the shutter is operated and either move it enough to reduce its brilliance or eliminate it entirely. But if we first find it in the negative, we can only lower its tone by retouching or by giving the small area a much lengthened printing time. Since the retouching process is difficult and demands a great deal of practice, it will be better for us to remove the trouble in the printing.

Naturally a too-light area in the print needs more exposure than its surroundings to darken it to their tone, and if that area is nearly white it may need two or even three times as much exposure as the rest. We give it the extra time by permitting the light—whether it be an enlargement or a contact print—to fall on the small part without hitting the rest of the print area. Either before or after the whole picture is exposed we hold a card with a hole in it in the path of the light so that none gets to the paper—or the negative if it is a contact print—except in the desired place. The hole in a piece of paper that is nearly opaque enough to protect the other areas will be torn or cut in a shape that matches that of the area to be darkened, and it is held away from the sensitized printing paper. If it is laid on the paper or held too near it, there is almost certain to be a clear line to show where it was used—a give-away that will make the print worse than if no change had been attempted at all. So we hold the masking paper a few or so from the sensitive surface—the exact distance will depend upon the size of the print—and keep it in slight motion during the extra exposure to make the edges of the darkened spot blend with the surrounding

The exact area that will print as the light passes through the hole will have to be found by experiment, but the process is easy and can quickly be mastered. If a large area is to be darkened, we might use a large card. For a sky, for example, we might hold the card ten inches from the print surface and move it slowly back and forth so that its shadow falls near the horizon. The fact that the edge of the sky area is a bit lighter than the space just above it will not matter for the sky there is almost always grayer than it is farther up. If trees or buildings protrude into the sky area, we may need to cut the card so as to give them a little shadow, but be careful that that shadow does not make a light area around the projection.

If a central area is to be lightened, it will be best to fasten a card or a wad of cotton to the end of a piece of wire and hold it in the desired place. The wire will not show if it is kept moving in the way that the card

"YELLOW IRIS"—PRIZE PICTURE BY HOWARD WATKINS

f course, needs to be throughout the whole
ne it is used.

It may well happen that one print needs
be held back in some spot and darkened
others. If we decide from a straight print
at this is the case, we determine the right
xposure for each area and then expose for
ıy one section first. Follow with the other
ering exposures and then develop the print.
is faster and easier to do than it sounds,
d it will do much to improve our results.

The Contest

The one hundred eighty-six entries in the
ovember "Flora Contest" gave the judges
en more trouble than they usually have,
ot only because of the number of prints, but
so due to the excellent quality of the last
irty or so to be eliminated. You might be
terested to know how the judges work.
ith the entries before them, they first elim-
ate all the prints whose standard makes
em hopeless, either because of poor print
ıality or for some other reason. This weeds
t more than half and leaves the real work
be done.

Careful inspection of each one gradually
moves all but a few whose technique and
bject matter are well above average. With
r. Anthony and Mr. Lootens working sep-
ately they eliminate one after another until
ı or twelve remain. Then each judge rates
ese in order, and the number of their prefer-
ence is written on the back of the prints. One judge might number them as 1, 2, 3, 4, etc., while the other might place the same pictures as 5, 3, 4, 7, 2, etc. The two prints whose total of the two numbers is least are the winners and the next two are the runners-up.

This month the winners are Howard Watkins' "Yellow Iris", and Dr. William H. Bard's "Milkweed Pods". The runners-up are George A. Hyde, and our old friend, Hugh M. Halliday. All four pictures are splendid and the makers are to be congratulated.

Remember that the December Contest is the last before the announcement of the winner of the grand prize, the $25 merchandise award from Willoughby's Inc., 110 West 32nd Street, New York City.

This and That

Two enlarging papers that have a wide contrast range have appeared. The Defender Vari-Gam is now available, and the Eastman paper, the name of which has not been announced, will soon be ready. The contrast is varied by using blue or yellow filters over the enlarger lens, and great control is possible by using one filter for part of the picture and another for the remainder. Development is as usual and the papers cost about the same as others.

(Continued on page 545)

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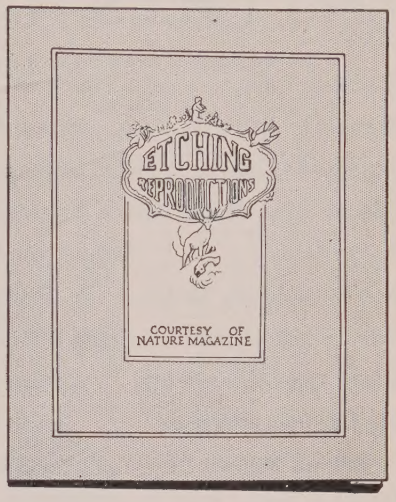

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Devoted to the Practical Conservation of the Great Natural Resources of America

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ON THE RECORD

The most endearing, exciting and memorable thing about all great music is melody. The most directly appealing quality, to everyone from nine to ninety, is the song-like quality of music—its melody. The one material which the composer has, to touch every human heart and to make a deep and lasting impression, is melody. Melody is "the heart of the symphony."

The vital melodic content of the Beethoven Fifth, the Tschaikowsky Fourth and Fifth, the Dvořák "New World," the Schubert "Unfinished," the Brahms First, the César Franck D minor, and Rimsky-Korsakow's *Scheherazade*—the heart of eight great symphonic movements, each one a complete and logically formed musical unit, each devoted to the melodious essence of the music—is now available in Victor's sensational new album, *The Heart of the Symphony,* played by the Victor Symphony Orchestra under the direction of Charles O'Connell (Black Label Classic Album No. G-15; $3.50).

Countless thousands of people, who have neither the time nor the inclination to study music seriously or professionally, nevertheless love great music, and they love it most when it is melodious. Countless others would love it if they knew it. And all love it in proportion to its melodic content. For both grown-ups and children, *The Heart of the Symphony* album is a wonderfully pleasant and fascinating introduction to the world of symphonic music. It imposes no strain on the intellect; it is concerned with the ear-value, the sensuous aspects of music, the qualities that appeal universally to young and old, musically sophisticated or not—in a word, the melodious qualities. Each symphonic movement has been condensed to approximately five minutes, eliminating the technical development which is intellectual rather than emotional, sometimes more technical than musical, and often difficult to understand.

The variety and scope of this unique album are extraordinary. There is the first movement of the Beethoven Fifth, with its enormous power and drive, its restless energy, its tenderness and its fire. There is the sublime sentiment and rich orchestral color of Schubert's "Unfinished," with its peerless orchestral song—known to millions by the vocal setting "You Are My Song of Love"—set forth exactly as the composer left it. There is the longing and sweet pain of Dvořák's "New World," with its deathless song of homesickness and loneliness, the "spiritual" that everyone knows as "Goin' Home"; there is the sublime spirituality of César Franck's great symphony—the second most popular symphony in all music—with its wonderful solo for English horn and its rich orchestral background. There is the coy and mischievous humor of the *pizzicato* movement of Tschaikowsky's Fourth, in which the melody is outlined by the strings plucked, rather than bowed; the glowing passion of the Tschaikowsky Fifth—the "Moon Love"—melody; the nobility and grandeur of the Brahms First, with its majestic chorale (based on the familiar "Cambridge Quarters" that you have heard from every chiming clock), plus the heroically masculine melody of the final movement that follows the chorale; and finally the blazing vividness of "The Festival at Bagdad" from *Scheherazade,* outlining in brilliant oriental color and feverish rhythms the sights, sounds and hues of an Eastern pageant.

Scholastic music critics will not enjoy these records, because the purely intellectual phases of the music have almost entirely been eliminated. People who love music as beautiful sound, as an expression of emotion that cannot be put into words, as stimulating to the imagination and the senses—these will find in *The Heart of the Symphony* the answer to a demand that has sometimes been inarticulate but nevertheless both powerful and universal. We believe that this album does a service to music and to those who love it, by bringing its melodious essence, in all its orchestral glory, without the alteration of a note, to the widest possible circle of music lovers, in a most enjoyable and economical form.

Vegetation Maps

Since 1926 the California Forest and Range Experiment Station, maintained by the United States Forest Service at Berkeley in cooperation with the University of California, has been engaged in mapping the natural vegetation of California and western Nevada. One product of this survey is a set of maps portraying, as far as the base permits, all the important features of the dominant vegetation just as they occur on the ground. Broad types made up of plant associations having generally similar use, economic importance, and fire-hazard characteristics are shown in color. For those who need greater detail the individual plant associations are also shown, with their dominant species indicated by symbols. This information is presented as an overprint on the standard 15- and 30-minute U. S. Geological Survey topographic quadrangles (approximately 1 inch and ½ inch to the mile, respectively). On wide margins are: the legend; brief descriptions of the type classification basis and the various types found on the quadrangle; a table summarizing the type areas by counties, national forests, and parks; and a profile illustrating the relationship of types to elevation and slope exposure.

Twenty-one of these map units have now been published, and others will follow as funds are provided. Although they furnish at a glance information that could be duplicated only at considerable effort and expense, they are being sold at cost—$1.00 per copy. A list of the quadrangles available, and the maps themselves, may be obtained from the University of California Press, Berkeley, Calif.

Santa Barbara Trees

Santa Barbara, California, is known as a garden spot and a haven for lovers of trees, shrubs and flowers. Such being the case, the publication of *Trees of Santa Barbara* will meet with a hearty welcome. Written by Maunsell Van Rensselaer, Director of the Santa Barbara Botanic Garden, this is a joint publication of that Garden and the Board of Park Commissioners of that city. It is a handy and well illustrated index to the trees growing in a region within about fifty miles of Santa Barbara. Some 550 species are listed and many specific trees are definitely located. A 142-page book, including index, copies sell for seventy-five cents, paper bound, and $1.50, cloth bound. They may be ordered from the Santa Barbara Botanic Garden, Santa Barbara, California.

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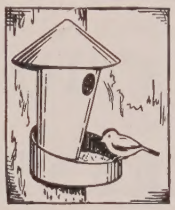

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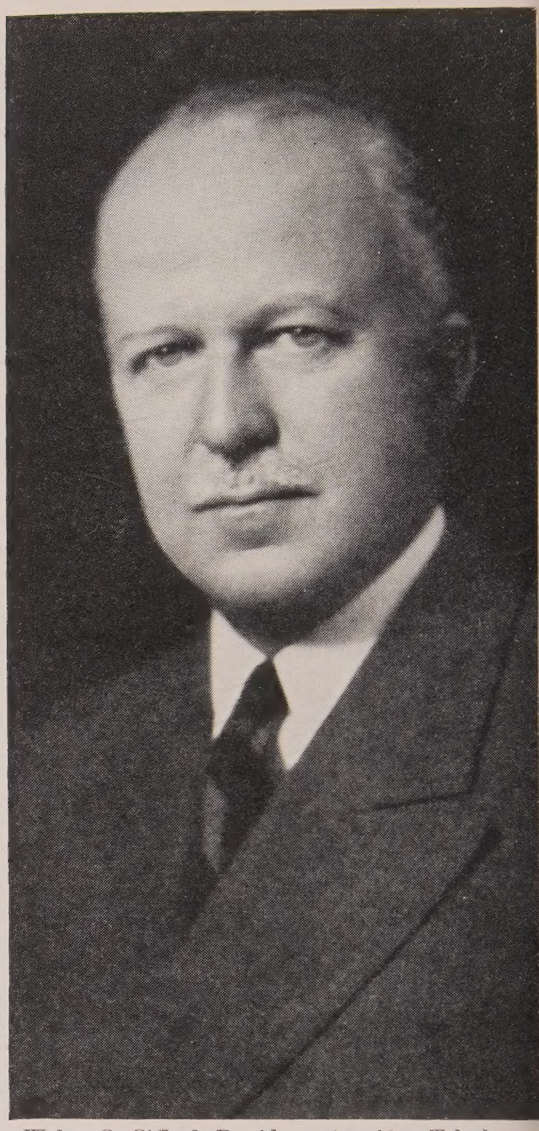

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THE BELL SYSTEM IS READY TO DO ITS PART IN THE NATION'S PROGRAM OF NATIONAL DEFENSE

Nature in Print

By HOWARD ZAHNISER

THOSE who have abandoned vacation plans for another season and have resigned themselves to the duties of their work-a-day worlds may find it somewhat teasing, in their fireside armchairs, to read about travel books in November. On the other hand, they may be in just the right mood to appreciate highly the vicarious transportation that such volumes offer and to welcome the early suggestion of another coming season of travel. With the world in the turmoil of conflict, or the intensified industry of defense, it may, in fact, soon be necessary to do most of one's distant traveling between the book ends, a sort of touring that at least will not be subject to any seasonal limitation. In any case there are travel books* at hand that will certainly be enjoyed, no matter how the enjoyment may be explained.

Frederick W. Pickard, an American business man, traveled to New Zealand with an angler's pretext. Doris Montgomery and Mary Van Nest toured the Gaspé Peninsula with the typical interests of a tourist and photographer. Sven Hedin explored in Asia as a scientist and geographer. And John James Audubon traveled through the American wilderness of his day in his romantic and arduous search for birds that would live again in his paintings and writings. Yet the writings of all these travelers, now attractively at hand, are not only stories of individual quests and adventures but also the most vital kind of descriptions of parts of the world and ways of living that are far away or long ago.

Mr. and Mrs. Pickard wanted to see the Southern Cross, but their main quest was for fishing experiences, although this emphasis may have been a bit one-sided, the book being dedicated "To All Fishermen and Their Long-suffering Wives." However that may have been, the author confesses that "actual acquaintance with the Dominion accentuated the descriptive side," which must have been quite delightful for his photographer companion. Their resulting book does, as Mr. Pickard hoped, "serve to introduce its readers to an unusual, highly scenic and really delightful bit of the earth's surface," although unfortunately war clouds are part of the picture. But one of its most interesting subjects is, after all, the fish and fishing in this country, where the early settlers found a land of rivers, but of rivers "practically without fish." This condition was, of course, intolerable for the British sporting instinct, and Mr. Pickard's fish stories are ample testimony to the remarkable results of the New Zealand fish stocking, which he describes. Readers will also find either helpful or teasing Mr. Pickard's discussions that make it easier for others to visit New Zealand, to fish or merely to travel.

Traveling, of course, is often more a matter of departure than of arrival, and distance in miles is not necessarily the most important attraction. Without going a very long ways from home, Mary Van Nest and Doris Montgomery found a different way of living on the Gaspé Peninsula and a change of scene that was refreshing. As their essays and photographs demonstrate, the country "generously and without dissimulation . . . revealed its life and heart," and *The Gaspé Coast* is an excellent volume for other prospective visitors. Yet, provoking further envy, the escape from an affliction common to most of us is always apparent. "Time means little, world happenings less. Ocean, wind, sky, rain, fog: these are the things that matter;" these words stand out on the first page, and the theme recurs again and again: "The complexities of modern living seem to resolve themselves into nothing of any moment." . . . "We had been free for a time from our taskmaster, Time." . . . "We had learned to stop the car and drink in the special beauty of some bit of land or sky." . . . "Our hearts were at rest—we had been far from the beaten paths of men, and along the way somewhere we had felt a gradual renewal of our spirits." Readers will enjoy the accounts of trips to bird colonies, through fields of flowers, but I believe that most of all they will enjoy sharing the satisfactions of two "hearts at rest."

Certainly, however, no hearts-at-rest theme pervades the writings of Sven Hedin or John James Audubon, although they endured the hardships of their quests serenely and triumphantly, even, one feels, with a deep sense of satisfaction.

Through desert regions of Asia, Sven Hedin conducted his expeditions of exploring scientists in a flotilla of canoes that had to carry also all their provisions for long periods. The rivers they thus traveled and the motor-car trails they followed or pioneered were narrow indeed in a vast country. The results of these expeditions, it goes without saying, are invaluable to geographers, biologists, Governments, and those who must establish trade routes and lines of travel, but it is a noteworthy fact that Sven Hedin has written his highly serious account of these expeditions so eloquently that they will be as fascinating to many readers as the latest work of fiction. This has been true of Sven Hedin's (Continued on page 546)

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*Recently published books discussed in this article are as follows:

Trout Fishing in New Zealand in Wartime. By F. W. Pickard. New York: G. P. Putnam's Sons. 1940. 180 pp., outline map and 38 photographs by Mrs. Pickard and the New Zealand Tourist Association. $2.

The Gaspé Coast in Focus. By Doris Montgomery. New York: E. P. Dutton & Company, Inc. 1940. 88 pp., with map on end papers and 56 photographs by Mary Van Nest. $3.

The Wandering Lake. By Sven Hedin, translated from the Swedish by F. H. Lyon. New York: E. P. Dutton & Co., Inc. 291 pp., with index, 32 photographs, 76 sketches by the author, and 10 maps. $3.75.

Audubon's America: The Narratives and Experiences of John James Audubon. Edited by Donald Culross Peattie. Boston: Houghton Mifflin Company. 1940. 329 pp., with index by Francis H. Allen, map of Audubon's travels in America on end papers, and 17 of Audubon's paintings reproduced in full color by offset lithography. $6.

"THE RISING CLAMOR OF WILD GEESE
BETOKENS THEIR DEPARTURE FROM
THE MARGE"

NATURE MAGAZINE
VOL. 33 · NOVEMBER · 1940 · NO. 9

Muddy Marges

By JOHN LINDSEY BLACKFORD

Illustrated by R. Bruce Horsfall

AN ENDLESS, flat, and muddy shore stretches before us, a wide and featureless reach of lake, but what matchless beauty is here when there are wings over the water. These oozy edges, these miry margins are the world of the shore birds, and over the intervening waters their aërial companies pass in stirring and surpassing flight. Formations that shape and evolve, change and disappear, grace the mirrored surface as the flocks lift and fall, circle and glide, or speed away with low, steady winging. The lure of muddy marges may not at once be evident, yet it is as real and tangible, as persistent and irresistible, as the call of any dominion of the wild.

There the dazzling sun-sheen reflects from the placid water; here the contoured shoreline leads half a mile around where it is but a hundred yards across. The sun strikes mercilessly, and the heat beats into one's face in shimmering waves; but there is a fascination about the migrants of the muddy littoral that carries us on. In our nostrils is the not always unpleasant stench and reek of the littered shore; back from the moist, newly uncovered shallows is the baked and cracking slime; and farther up, creeping vegetation. Out upon the silver sheets of these permanent or playa lakes of the wide valley-land and prairie, ride waterfowl flotillas. A heron stands sentinel at an island point. We hear the mellow croak of a phalarope about to land nearby, and from overhead comes the rasping cry of Forster's tern.

STILT SANDPIPER, WHOSE KIND ARE MASTERS OF BEAUTY IN FLIGHT

Ahead, along the circling shore we follow, an avocet sifts the bottom silt for midge and mosquito larvae. Before we have come near he is off to a distant bar; but later he flies to meet us, circles on fast-flashing pinions or glides by on arched wings to the accompaniment of his strident call. We are made to know that we trespass on nesting ground as the anxious and courageous bird dashes directly toward us, averting collision only by a last minute bank of those splendidly maneuvered wings. Quickly again comes the whistle of cleaving pinions as he slashes by shoulder high from the rear. We continue on, and forsaking his attack he returns to his wading. With a suffusion of cinnamon on head and neck, body plumage white and black, he stalks on long, blue-gray legs, searching the shallows.

One killdeer lands just ahead with a running glide; others join him, closing their narrow, pointed wings and sprinting before us. One may not cross or even approach a mud flat here without gathering around himself this shrill-voiced company. Theirs is

the heavy responsibility of warning all, including the keen-sighted sandhill cranes, the wary gray geese, and the subtle water witches. Notified of our sinister coming by the alarmists, a mother mallard puts out hastily for deep water followed by an obedient little fleet.

Here is a company of long-billed dowitchers, the funny folk of the mud flats and shallows. Their attitude of friendly indifference permits of closer study. Any who are not interested in larval mosquitoes, aquatic worms and water beetles are quite beyond their ken, as they themselves are ever engaged in the absorbing search. Probing in bill-deep water they march together around the shore. So efficient have they become that it appears as though probing bills were synchronized with wading feet. The dowitchers are the comic reel of this lakeside picture.

The ponderous but impressive progress of a great blue heron crossing the wide expanse of water with slow, heavy beats is another authentic memory of the changing scene.

A close-up is caught as we round a mounded point and surprise a number of mallards and shovellers in a small weed-grown inlet. Their breasts shiny with the thin green slime, they rise with quack and commotion. Other swift-winged, streamlined flocks go by, some to outlying pools, some returning.

Following the curving margin we come upon a group lined up along the shore, each balanced upon a single lengthy leg. Here is a bird that comes in two sizes; for all that may be seen, that is the only difference between greater and lesser yellowlegs. In low skimming flight over the surface a few have passed around us; others move on ahead. One dashes about crazily, jabs beneath the surface, tries again, and secures as the reward of his dexterity a finny titbit.

Commonly in yellowleg company are the sandpipers, miniature masters of beauty in flight. With flashing underwing and body plumage gleaming they join with larger relatives in memorable retreat. In long lines or in massed squadrons, in changing crescents, or weaving echelons, these tiny battalions maneuver above the water. In curving sweep they return, pass, and speed away on an unpredictable course, leaving certain and lasting impressions.

Although theirs is the same muddy environment, and they are by no means so far off the ground as the greater and lesser tattlers, the sandpeeps keep their feathering as immaculate as that of their taller cousins. But when one is often obliged to distinguish between species principally by the color of their small legs, the mites appear to comprehend your design and accumulate either a fine coating of mud upon their waders or else stand off belly deep in the ripples.

Elsewhere than the wide lake littorals the shorefolk resort to beaches, grassy ponds, river flats, reedy margins where receding waters expose a moist mud line, and the oozy circumference of slimy sloughs. Many of the transient deft-winged waders that today haunt our inland waters tomorrow will parade about upon some pebbled or sandy ocean shore.

Flocks of the dainty northern phalarope, like those of the small sandpipers, present on the wing sights of unforgettable beauty. These miniature, aërial fleets disclose a remarkable sense of coordination between the birds in their shifting, varying flight. Apparently there are no leaders in the flock, no bird or group of them takes command, the pattern of their formation is swiftly, constantly changing, and their course is so unpredictable as almost to be termed erratic. Nevertheless, individual phalaropes retain their positions in the speeding unit, shift as it shifts, maneuver with its maneuvers, lift and rise and fall with the hurtling, circling flock, all without evident leadership. It is a miracle of wings.

". . . WHAT MIGHT THOSE MIGHTY MIGRANTS BE—SAVE MARBLED GODWITS?"

The slowly sinking waters of summer and early autumn expose the miry bottom, which, with the change, becomes the moist margin. This muddy marge is the registration book of countless webbed, lobed, palmated, and long-toed feet. Written by those of whom it tells, and bearing their signatures, it is doubly authentic. Descriptive and narrative in text, its characters are its authors. It is an ancient book, older than any records of our own, and should you doubt it momentarily, recall that bird tracks as well as mud cracks were written millions of years ago into the pages of geologic time.

Recording as it does so many migrant as well as resident feet, its chapters are worthy of careful perusal and study. Here are the great tracks that measure the stride of a heron; there the blue spearman waded out to his depth. Here are the heavy imprints of Canada geese, and closely following the water's edge or turning away to open shoreland are the tracks of plovers. Minks write here of their

unting, while the muskrat's distinctive pen mark is his vavy tail-line in the mud. These and other headlines in arge type are superimposed upon countless pages of finer rint, the stories told by sandpeeps, pipits, dowitchers and nipe.

It was the latter part of July when I saw across wide nud flats a group of large shore birds moving along a listant marge. Studying them as I cautiously approached, hese characters became more certain and evident: They vere larger than any true bird of the shores save the long-illed curlew. Their bills were long and straight, or slightly pturned; therefore the owners were not to be confused vith members of the curlew clan.

This flat valley land in northwestern Montana, flanked n the east by the towering wall of the Mission Range, vas far from the habitat of the Pacific godwit. The Hudsonian odwit, on the other hand, gener-lly passes southward east of the reat plains. Both wear at this eason more distinctive dress than vas possessed by the birds I now vatched so intently. These great horemen were extremely wary nd their uneasiness grew. I could istinguish about their nearly uni-orm plumage no certain identifi-ation mark. Apparently the lightly reddish-brown and dark rown of the body coloration pre-ailed upon bill and legs, yet of his I could not be sure. Accord-

N AVOCET, SMART IN VIVID ACK AND WHITE, THE CIN-AMON OF SUMMER DISCARDED

gly I moved nearer with great care. I had paused over hundred and fifty feet away and with my renewed ad-nce the thirteen great birds took to wing. Their mag-ificent passage before me did not disclose the conspicu-us white upper tail coverts of Hudsonian godwits. Al-ough they curved and shifted in flight and circled once, heir course was charted to greater and vaster evolutions, heir winging was more purposeful, and their destination vas for a far more distant shore line than is the case when heir lesser relatives depart. I had not come sufficiently lose to perceive any subdued barrings upon their highly rotective coloring, but what might those mighty migrants e—save marbled godwits? In sadly diminished, almost egligible numbers they yet pass from their nesting range n the center of the continent, from North Dakota and askatchewan, directly east and west to both oceans. The ance of these birds, their walk, their character and be-avior, as well as their appearance left to me no other onclusion.

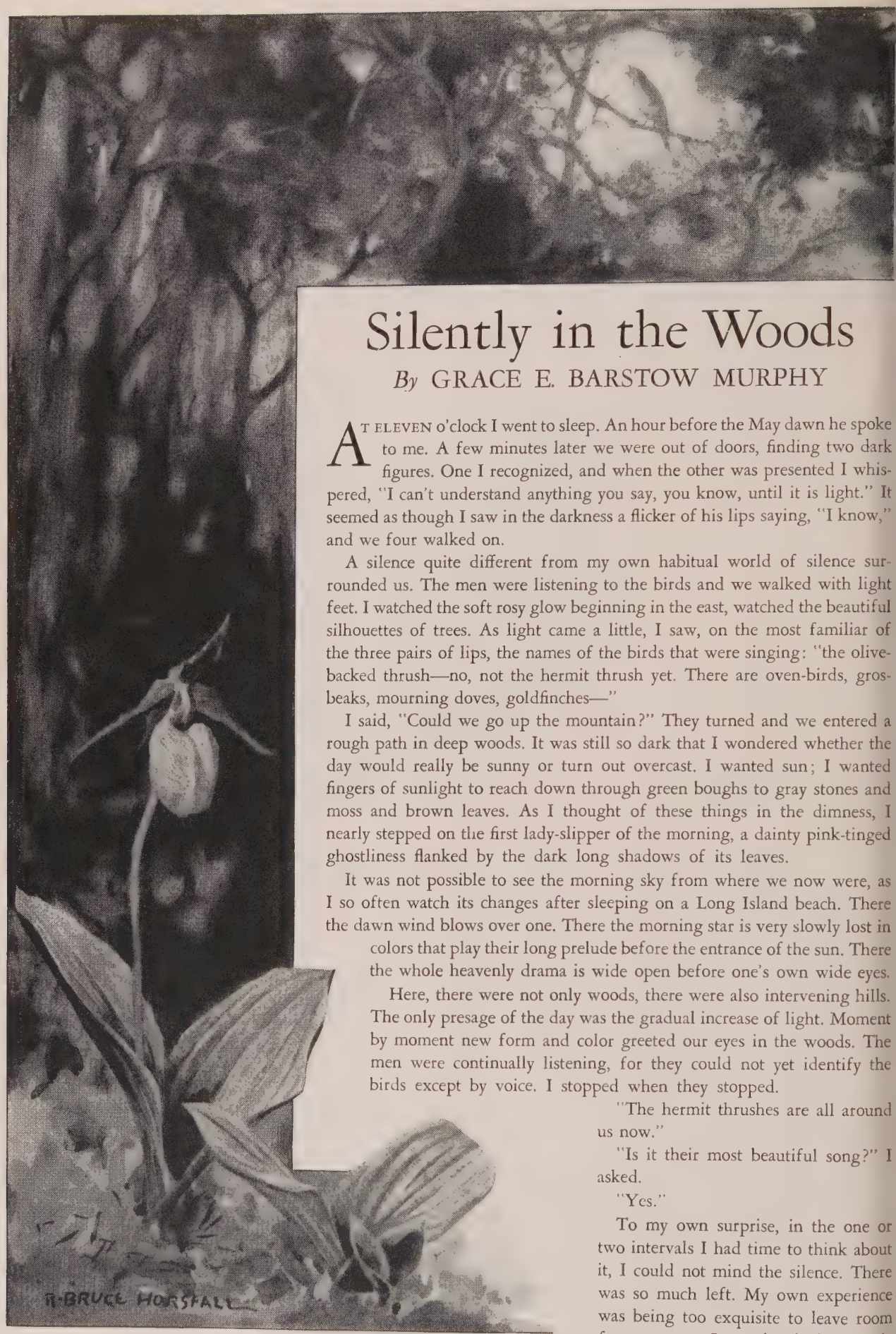
Invading one late summer afternoon a broad and shal-w lakelet, where scattered tules grew or walled together arkly upon the far side, I aroused the fears of the western willet population. They left their oozy walks and muddy retreats en masse and swept over me in a battalion, thirty strong; with their clamor suddenly rising from the rear I shipped two boots full of water. After that initial raid I was left to pry into the secrets of inlet and estuary usually with but a single shrieking elder as "guide". At intervals several youngsters, now hardly distinguishable from adult birds, rallied to the racket and soon the nerves of all reedland dwellers were on edge. Twice I met a greater yellowlegs in the company of two drowsy dowitchers. So greatly had the willets preyed upon the sensibilities of this gentleman on stilts, that, in each instance, his spasmodic jerkings and suspicious pacings about were sufficient to send the two long-billed dignitaries off with him long before dowitchers are in the habit of regarding me with doubt. Of course the greater tattler is something of an alarmist himself, but never before had he appeared so unnerved.

Autumn arrives, and with its myriad migrants, wings are weaving over the shimmering waters. In courses as curving and graceful as the contoured strand, they come and are gone. Momentarily they are with us, tonight they journey toward another continent.

A troop of avocets, smart in vivid white and black, the cinnamon of summer discarded, march along the margin of a prairie lake. How striking those migrant wings, how indescribable is that fleet when in flight!

An occasional pectoral sandpiper investigating a low-land mud flat shows us how reserved his kind may be in fall, and his unobtrusive manner among his Baird companions leaves little else to record than his model behavior. Little regiments of semipalmated sandpipers grace the lake with low winging, punctuated with their piping converse.

The lowly snails and crustacea of the mud line are charms indeed when they delay, however briefly, those knights of the flyways, the (Continued on page 549)



Silently in the Woods

By GRACE E. BARSTOW MURPHY

AT ELEVEN o'clock I went to sleep. An hour before the May dawn he spoke to me. A few minutes later we were out of doors, finding two dark figures. One I recognized, and when the other was presented I whispered, "I can't understand anything you say, you know, until it is light." It seemed as though I saw in the darkness a flicker of his lips saying, "I know," and we four walked on.

A silence quite different from my own habitual world of silence surrounded us. The men were listening to the birds and we walked with light feet. I watched the soft rosy glow beginning in the east, watched the beautiful silhouettes of trees. As light came a little, I saw, on the most familiar of the three pairs of lips, the names of the birds that were singing: "the olive-backed thrush—no, not the hermit thrush yet. There are oven-birds, grosbeaks, mourning doves, goldfinches—"

I said, "Could we go up the mountain?" They turned and we entered a rough path in deep woods. It was still so dark that I wondered whether the day would really be sunny or turn out overcast. I wanted sun; I wanted fingers of sunlight to reach down through green boughs to gray stones and moss and brown leaves. As I thought of these things in the dimness, I nearly stepped on the first lady-slipper of the morning, a dainty pink-tinged ghostliness flanked by the dark long shadows of its leaves.

It was not possible to see the morning sky from where we now were, as I so often watch its changes after sleeping on a Long Island beach. There the dawn wind blows over one. There the morning star is very slowly lost in colors that play their long prelude before the entrance of the sun. There the whole heavenly drama is wide open before one's own wide eyes.

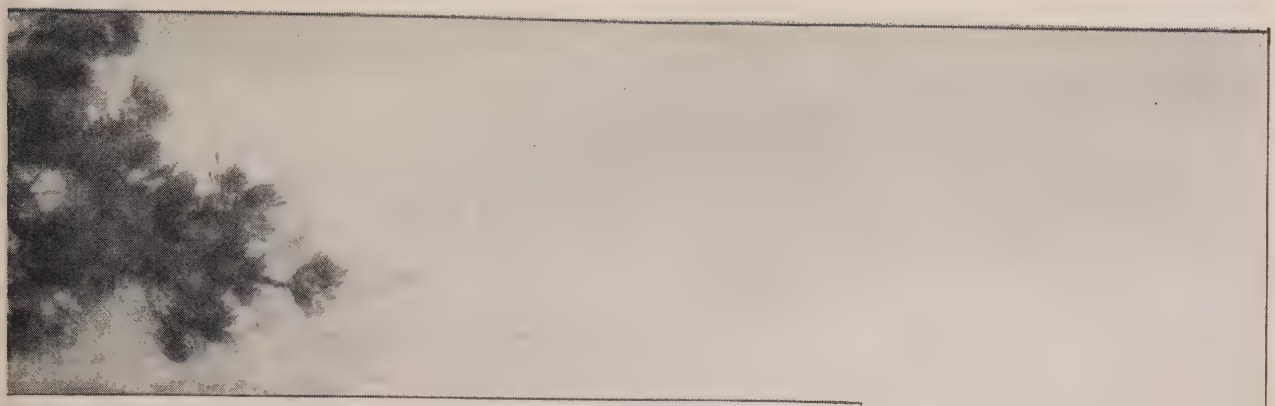
Here, there were not only woods, there were also intervening hills. The only presage of the day was the gradual increase of light. Moment by moment new form and color greeted our eyes in the woods. The men were continually listening, for they could not yet identify the birds except by voice. I stopped when they stopped.

"The hermit thrushes are all around us now."

"Is it their most beautiful song?" I asked.

"Yes."

To my own surprise, in the one or two intervals I had time to think about it, I could not mind the silence. There was so much left. My own experience was being too exquisite to leave room for any regret. I was absorbed primarily



Because it represents a courage sorely needed in a troubled world; because it expresses a philosophy of life that is inspiring; because it is beautifully written, we regard it as a privilege to publish in these pages this article—"Silently in the Woods."

in the beauty of line of everything about me. I was studying line. I was engrossed with line as the old Japanese artists must have been engrossed, as Leonardo understood and loved it, who himself made perfect line. A pine stood straight, with the line of its trunk direct from earth to top. A birch, which had been broken midway, had sent up its highest branch and so forged a turned continuity of line. The line of each tree trunk with its group of boughs, hidden here and there by the spring leaves, which only lent emphasis, gave way to smaller lines of new growth, and they in turn to the lovely tracery of line on leaf. Baby maple trees, new-born and inch-high, made perfect symmetry, perfect pattern of opposing leaflets.

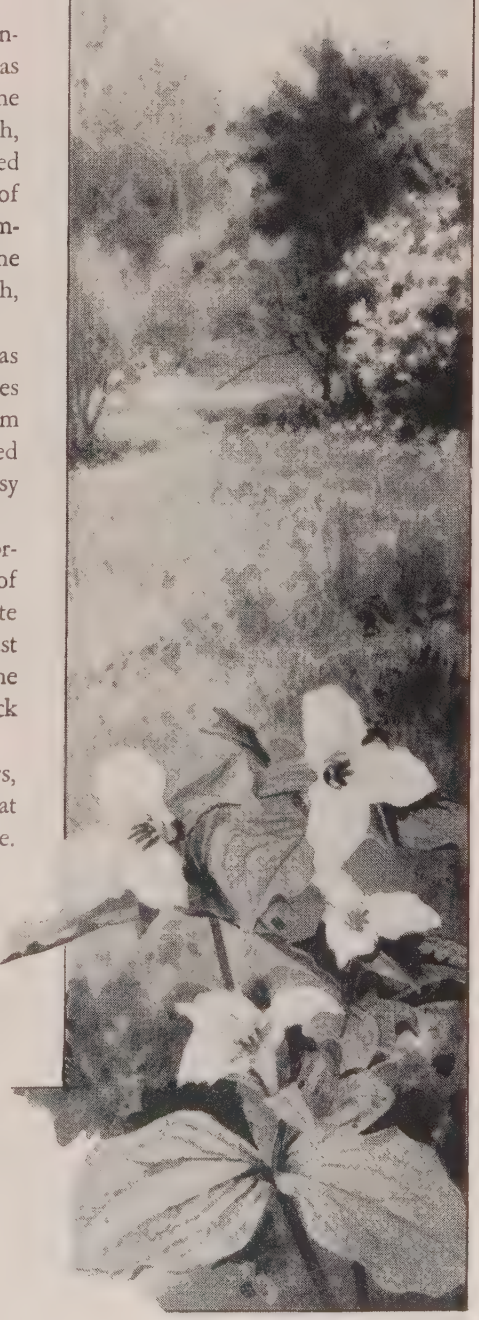
We walked on. We crossed a clear, sweet-watered brook. The ground was more open, and everywhere about us flowers grew. April's belated anemones and trilliums and violets overlapped in time the budding laurel to bloom in June. Hawthorn and azalea were out. Tiny promise of apples had replaced earlier clouds of pink and white. Buttercups filled the fields, and daisy buds were plump.

We had crossed the ridge and were walking uphill again along a forgotten road. Indigo buntings and scarlet tanagers made vivid splashes of color in the tree tops. No one knew the way. We saw a group of white buildings, a widely spread-out farm, but not even a dog barked at half-past six on a warm spring Sunday morning. We decided to break through the woods, without a path, following the sun and our sense of direction back to our own hill and valley.

The sun was bright and shone on the exquisite pink of the lady-slippers, enhancing the darker veins, and emphasizing the black-green leaves that make still one more of those color schemes that are the genius of Nature. It shone on fat red checkerberries, which were refreshing to our thirsty mouths. We sat on stones and ate sandwiches. We became beautifully lost. We reached a stone-walled field high on the ridge. Huckleberry bushes were here in flower, blackberries and rhododendrons in bud.

"I know this place," said my husband. Yet he did not seem to know how to get out of it.

We rolled under barbed wire, and farther on through the woods came to an open, lush marsh, where there were innumerable birds. I said, questioning and wondering, "It seems as though sight alone, without hearing, is giving me a more poignant response to all this beauty than you can have, distracted by so many senses. Is this sentimentality, maudlin in escape from reality, or is it the law of compensation? Emerson was not sentimental when he wrote of compensation, and this thing seems intensely real to me."



Another ridge top, and we plunged down in earnest. We had walked almost steadily for four hours, completely content. Now home and breakfast prosaically beckoned. We had no path and the grade was steep. We dropped from trunk to trunk of sustaining tree. Suddenly a wood road met us, politely for my aching feet, not used in years to so many miles. Almost back to girlhood, I ran down, leaping from stone to stone, coming out into wide fields where cows were grazing.

My own ornithologist brought me his binoculars and said, "I want you to see that bird. You know it."

"No, I don't—unless it's a killdeer."

"You always know them," he said. We remembered back twenty years to a camping trip in Lower California, when I, too, could hear the killdeer's pleasant piping.

Yet, still, I could not sorrow for not hearing. Life was filled to the very brim. I had understood all morning Edna St. Vincent Millay's complaint:

"—Lord, I fear
Thou'st made the world too beautiful this year."

It was not until next day that I remembered how, on a May morning only eight years earlier, in the New Forest in England, I had left the others listening to their birds while I sat alone on ancient moss in an agony of sobbing. Why the change? I do not know for sure. Yet it is trite but true that no matter what is taken away, there is always a fullness of beauty left in the green world beyond walls.

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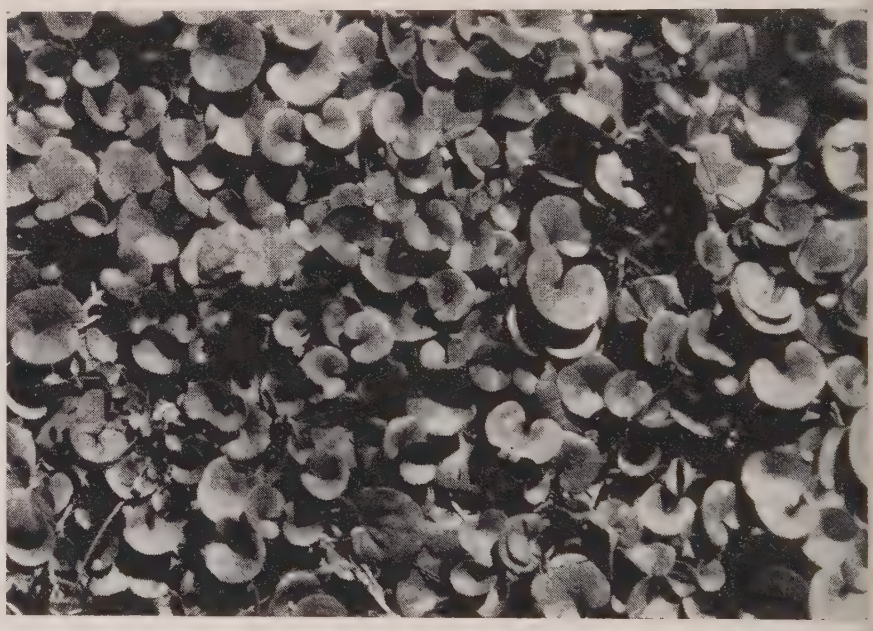
Pony's-foot

By ROBERT SPARKS WALKER



YES, it's a pony'sfoot. Just take a look at the photograph and see what a fitting name it bears. When I first met pony'sfoot—about a quarter of a century ago—growing among wild flowers and grass, I tried to classify it as some sort of a gill-over-the-ground. However, I noticed the shape of its leaves, changed my mind, pulled up a clump and found I had met a creeper that was entirely new to me. It bore the botanical name of *Dichondra carolinensis*.

Through the years since that time, I have had this lovely wild creeper under observation. For the last half-dozen years, I have found it growing on my own lawn. Just how and when it decided to come to my place, I have never found out.

In its natural habitat in the wilds, pony'sfoot clings to the damp but not water-soaked ground, especially where it is partially-shaded by open-headed trees. It makes no difference how densely the other grasses grow, pony'sfoot reminds you of a child with a good disposition who, on running into a crowded room, leaps into the laps of the guests, and apparently is happier and more contented than any others in the room.

A few years ago I began answering calls to identify a strange plant that was establishing itself in the lawns of many people living in my neighborhood. In every instance, I found my old friend pony'sfoot, which had pleased the owners so well that they wished to do everything possible to encourage it to remain with them.

Pony'sfoot selected the densest part of my bluegrass in the shade of a persimmon tree for its beginning. There it grows so thickly that it thoroughly mats the ground. Indeed, every time you look down you can easily believe there are thousands of dainty green pony'sfeet, with the bottom of the hoofs turned up. It is as lovely as the bluegrass itself. It is congenial with the other lawn plants, and apparently there is no fussing going on as to which is the rightful owner.

This delicate-looking plant spreads by its threadlike creeping stock in early springtime, and bears a tiny flower well concealed beneath its small evergreen foliage. Rarely does pony'sfoot reach high enough to be clipped by the lawn mower. Here is at least one pony'sfoot that has never been known to kick anyone.

Mercury—Lively Metal

The interesting story of quicksilver

By DR. HARRY M. DAY

General Electric Research Laboratory

THE GOD MERCURY

A Latin deity who has given his name to the metal, quicksilver, to a planet, and to an herb, and also supplied the adjective mercurial, which describes quicksilver temperament in an individual

Did you ever accidentally break a thermometer, and then try to pick up some of the heavy silvery droplets of mercury that had spilled out? They were liquid, yet they did not wet the table's surface. They scurried elusively about; they defied your efforts to seize them. No wonder the Romans christened that mysterious liquid "argentum vivum," and we today call it by the English translation of that same name—quicksilver.

Many people do not recognize mercury as a metal simply because it is a liquid. It is a true metallic element, nonetheless—just as much a metal as tin, zinc, or lead. The fact that we usually see it as a liquid means simply that its melting point happens to fall below our ordinary temperatures; it is, strictly speaking, a molten metal. Professor Braune, at St. Petersburg, first succeeded in freezing it at forty degrees below zero, and recognized its true metallic properties. In its low melting point, mercury is unique, and out of its uniqueness arise many of its uses and its indispensable services to mankind.

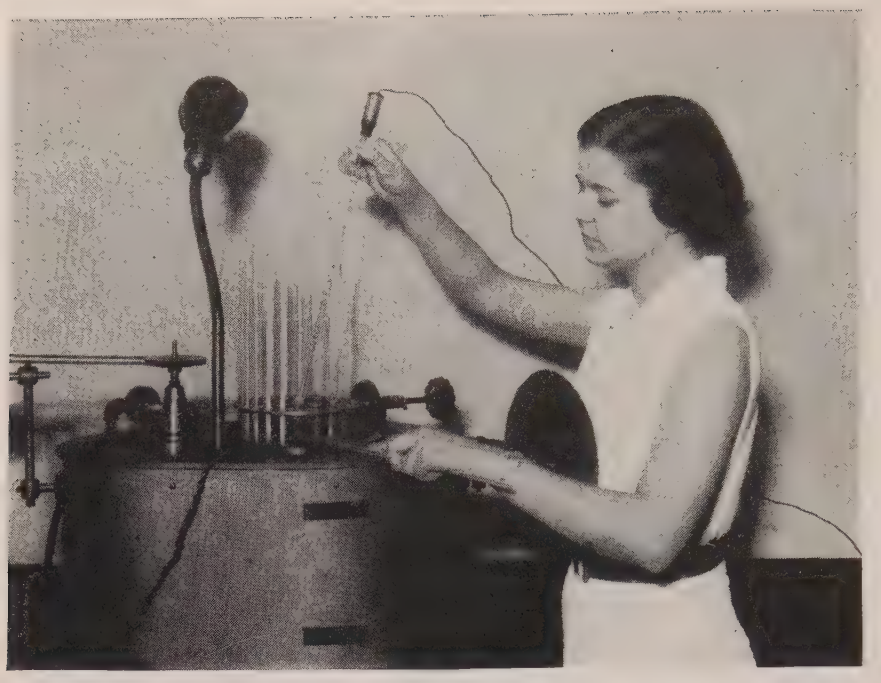
The history of quicksilver is shrouded in romance, and we would have to turn the calendar back to a period long before written history to discover the first use of its commonest ore, cinnabar. Cinnabar is the red sulphide of the metal, and was used as the pigment vermilion. In recorded history, quicksilver is first mentioned by Aristotle, who lived more than three hundred years before Christ. In the year 315 B. C. Theophrastus credited the Athenian Callias with the invention of methods to "beneficiate" cinnabar. In China records have been kept that mention both vermilion paint and the fluid metal. From these records we can be sure that not only was cinnabar used as a paint in early times, but that methods were known for reducing the metal from its ore.

Ten or fifteen centuries later in the mysterious brews of the alchemists were born the beginnings of chemistry. Some of the alchemists believed this versatile substance to be the metallic essence of all metals; while sulphur was the other component. In this way they explained that all metals were composed of various proportions of sulphur and quicksilver. The alchemists were familiar with amalgams, and it has been suggested that a sleight-of-hand substitution of a lump of gold-containing amalgam for a lump of lead may have been at the bottom of their reported production of gold from lead by transmutation.

Since the birth of experimental science, as we are familiar with it today, mercury has become an indispensable tool of the scientist. It was in 1643 that Torricelli constructed the first mercury barometer to measure the pressure of the atmosphere, and initiated the weather-prediction service that is so vital to modern navigation. In 1720 Fahrenheit invented the mercury thermometer, and in the latter part of the eighteenth century Joseph Priestly used quicksilver in his primitive gas-analysis apparatus to seal off water-soluble gases.

However, the first large demand for mercury was industrial and attended the introduction of the Patio process for extracting silver from its ores. This process, which was invented by Bartolomé de Medina at Pachuca, Mexico, in 1557, depends in part upon the ability of quicksilver to wet and alloy freely with silver. This alloying, or amalgamation, is essentially the same process by which many a beginning chemistry student has ruined a gold ring or the gold ferule of a fountain pen by rubbing it in mercury, or has made a shiny silvery coin out of a penny. Since mercury was the magic "Sesame" that opened the door to the wealth of the silver ores, it followed that the pomp and power of Spain was dependent in no small way on her control of the quicksilver mines of Spain and Peru.

In 1849 came the fabulous gold discoveries in California, to be followed by the development of the celebrated Comstock Lode in Nevada. These ores were like-



TESTING THERMOMETERS AT THE U. S. BUREAU OF STANDARDS

Working-standard, platinum-resistance thermometers are placed in an electrically controlled water bath to make comparative readings and to check errors in the standard tubes

wise treated by amalgamation processes, and the newly-found quicksilver mines in California again furnished the wand that transformed the ores into actual treasure. So dependent was the treatment of gold and silver ores on the supply of quicksilver that it was said "You need a quicksilver mine to run a gold mine!"

The most famous quicksilver mine is the Almaden, which is located in Spain and boasts a record unchallenged by any other mine in the world. For more than 2000 years it has been in continuous operation under the successive ownership of the Romans, the Moors, and the Spaniards. It is still the world's largest producer.

In the production of mercury the United States may be considered self sufficient, although during periods of depressed prices imports from Spain and Italy have augmented the decreased production resulting from suspended operations in marginal mines. Our domestic supply is centered in California, but valuable deposits of cinnabar are also located in Utah, Nevada, Oregon, Washington, Texas, Arizona, Arkansas, and Alaska.

The California gold miner began to use quicksilver when he discovered, to his consternation, that a large proportion of his precious metal was being lost as fine particles that washed over the riffles in the sluices, or "long Toms," along with the barren sediment. When a small quantity of mercury was placed behind the riffles, the gold alloyed with this heavy metal, and the minute particles were arrested in their uneconomic journey to the discard. The amalgam was collected, put into a buckskin bag, squeezed by hand to remove the excess of quicksilver, and then heated in a retort to drive off the volatile mercury as vapor.

However, it is not in the mining industry that the present-day flow of mercury from the mines serves us best, but in the manifold applications that modern civilization has invented for this amazingly versatile material. Less than one-seventieth of the United States' total consumption may be attributed to the amalgamation treatment of ores. It has been estimated that there are today more than one thousand distinct uses for quicksilver. Let us look at a few interesting ways in which man is helped by this willing substance.

Unless you are more fortunate than most in your dental equipment, you are walking about with some mercury in your mouth. If the cavity the dentist finds does not occur in one of your "smiling" teeth, he almost certainly uses an amalgam filling, because it is generally preferable to other types. This amalgam is simply an alloy of silver, tin, zinc, copper, and mercury. The rôle of the mercury

MERCURY IS USED IN THE MAKING OF A VARIETY OF LAMPS

The pressure of mercury in them determines the nature of the radiation from them, and this in turn determines the use to which they are put. Here mercury lamps light the United States Bureau of Printing and Engraving in Washington

MERCURY IS AN IMPORTANT METAL TO ALL VESSELS

The slow action of the salt in sea water converts the red oxide of mercury in antifouling paint on ship bottoms into poisonous bichloride of mercury that kills growths that attach to the hulls

is to alloy rapidly by shaking or kneading without the application of heat. The powdered metals are mixed with an excess of mercury, and the resulting putty-like material is forced into the cavity by pressure, which expels the excess mercury. This soft, conveniently-workable substance hardens by a complicated process in an incredibly short time to become a strong, highly-resistant material that will take a bright polish.

"They that go down to the sea in ships" know the value of the red oxide of mercury in antifouling paint for ship bottoms. The slow action of the salt in the sea water converts the oxide into the poisonous bichloride of mercury, which kills the marine growths and animals that attach themselves to the hull.

A contrasting modern use of quicksilver, having potentially great commercial significance, is the mercury boiler for the generation of electrical power and for the refining of oil. In the power installation, a mercury boiler furnishes mercury vapor instead of steam to run a turbine. The mercury vapor, after doing work in the turbine, condenses in a steam boiler, which in turn produces steam at a high pressure to run another turbine. Three of these units are now in operation, representing the most efficient conversion of the energy of coal, or oil, into electrical energy that man has yet devised. The large mercury power installation of the General Electric Company at Schenectady is operated with an efficiency of about 36 per cent, and it contains more than a quarter of a million dollars worth of mercury in its boilers.

ANOTHER MARINE USE OF MERCURY

The light beams from lighthouses pass through lenses that rotate in a pool of mercury

Another recent development that may soon become a part of most households is a mercury fuse for electrical circuits. A short circuit or overload heats the mercury, which volatilizes and condenses in an expansion chamber. By simply tilting the fuse, the mercury may be returned, completing the re-fused circuit.

If you wear a felt hat you help the owner of some quicksilver mine; something like one-seventeenth of the total consumption of mercury is used in the form of the nitrate to roughen the rabbit's fur hairs so they will adhere to each other to form felt.

While a great many applications of the metal require, in the individual instance, an apparently trifling amount, the aggregate is sometimes startling. For example the manometers with which physicians test blood pressures of patients would account in this country alone for more than 150,000 pounds of mercury.

TAKING BLOOD PRESSURE

Manometers used by physicians in this country alone require more than 150,000 pounds of mercury

It would be improper to pass over the uses of quicksilver without at least mentioning the wide application that it finds in the manufacture of various types of lamps. The pressure of mercury in these lamps determines the nature of the radiation from them, and this in turn determines the use to which they are put. So on the one extreme we have low-pressure lamps that emit ultraviolet or invisible light, and on the other we find tiny fused-quartz bulbs that operate at pressures exceeding one thousand pounds per square inch, and which may equal in intrinsic brilliance the common carbon arc.

The unusual combination of properties possessed by mercury secures for it innumerable obscure uses. Few who look at a lighthouse know that the light beam, which warns seamen of hidden shoals, passes through lenses that rotate in a pool of mercury. Nor do many realize that the tubes in a radio set were evacuated with the help of a mercury diffusion pump.

The consumption of quicksilver in the drug and chemical industries is enormous, even in peacetime. But there are two or three mercurial compounds that take on added significance in times of war. Calomel as a drug, and corrosive sublimate for sanitation, are considered essentials, while mercury fulminate is indispensable for the detonation of high explosives.

In the past, mercury has helped to determine the fate of nations, as when it enabled California to pour wealth into the northern states and so indirectly helped to decide the outcome of the Civil War. The part it plays today, though perhaps less obvious, is no less important. It enters subtly into almost every phase of our civilization; through its unique chemical and physical properties it permeates our entire industrial and social scheme. Versatile, lively, indispensable, the "argentum vivum" of the ancients, bearing the name of the messenger of the gods—mercury is among the more interesting members of the large family of chemical elements that man has learned to use.

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Stone Piltdown Man

By MAUD MATTOX KEITHLEY

THE ROCK face in the picture first attracted my attention in August, 1928. I was travelling south from Denver, Colo., on U.S. Highway #85, about a mile above Castle Rock, watching the storm clouds that were gathering to the southeast. Suddenly the dark rock formation appeared against the white mass of cumulus clouds, a perfect profile of a Piltdown man as drawn by Sterling, from McGregor's Restoration. His profile, with sloping forehead and receding chin, conforms to the version of scientists. There he stood, at the base of the front range of the Rocky Mountains, facing them, as one who looks to the mountains whence comes his strength.

GIANT TREES OF THE WORLD

By HENRY CLEPPER

Photographs, unless otherwise credited, from U. S. Forest Service

MOUNTAIN GUM OF AUSTRALIA

This tree, *Eucalyptus regnans*, ranks next in height to the redwoods and Douglas firs of the United States

PHOTOGRAPH AUSTRALIAN TRAVEL ASSN

WHERE and what are the tallest trees in the world? Stories have been told of gum, "ash" and "oak" trees in remote regions of Australia that were said to exceed five hundred feet in height. But when an American forester visited Victoria a few years ago and investigated some of those tall tales of tall trees, the tallest living specimen he found in that region was a mountain ash two hundred and sixty-three feet high. And he reported that it was an exceptional one.

Likewise, we frequently hear of specimens of our own California redwoods that are claimed to exceed four hundred feet in height. That story probably originated back in 1900 when the Division of Forestry, now the U. S. Forest Service, published a bulletin entitled *A Short Account of the Big Trees of California.* It told of a fallen big tree in the Calaveras Grove that was estimated to be more than four hundred feet long. However, to make a tall story short, Emanuel Fritz, a professor of forestry in the University of California, subsequently determined that the measurements included parts of two fallen trees.

We Americans take pride in our bigness—our big country, big cities, big buildings, and big rivers. And we can take pride in our big trees, too, because we have the biggest in all the world.

According to the *Journal of Forestry,* "the tallest living tree of unquestioned and authenticated measurement is a Coast redwood." This conifer, the mightiest member of the vegetable kingdom on earth, is unique among living things. It stands near Dyerville in

BIGTREE, THE INLAND REDWOOD

These trees, *Sequoia gigantea*, do not grow as high as Coast redwoods, but have greater girth

PHOTOGRAPH FROM U. S. FOREST SERVICE

THE RED FIR OF THE NORTHWEST

This tree, *Abies magnifica*, ranks in eleventh place among the tall trees of the world

ONE HEMLOCK CONTESTS FOR HONORS

This is the western hemlock, *Tsuga heterophylla*, the tallest of the four species of hemlocks

the Humboldt State Redwood Park, California. When measured by a redwood timber cruiser of long experience, it was found to tower three hundred and sixty-four feet into the sky. The Washington Monument is 555 feet 5⅛ inches.

As a matter of fact, we not only have the world's tallest individual tree, but also the world's next tallest. It, too, is a redwood, and it stands on Bull Creek Flat in the same county. In height it is three feet shorter than the world

THE WHITE FIR TIES WITH THE SILVER FIR

This species, *Abies concolor*, attains about the same height as its close relative of the Olympics

THE DOUGLAS FIR IS TRULY A NOBLE TREE

This valuable forest tree, *Pseudotsuga taxifolia*, ranks directly after the Coast redwood in height

THE SILVER FIR OF THE OLYMPIC MOUNTAINS

This tree, *Abies amabilis*, shares thirteenth place with its relative, the white fir of the Sierras

THE SUGAR PINE IS A TRULY BEAUTIFUL TREE

Known as *Pinus lambertiana*, this is the tallest of the pines and is probably the tenth tallest tree

THE MOST NOTABLE OF THE SPRUCES IS THE SITKA

Picea sitchensis is a coastal spruce and can safely be called the seventh tallest of our trees

THE COAST REDWOODS ARE THE TALLEST OF THEM ALL

Sequoia sempervirens claims first honors for height and a forest of these trees is the most beautiful of all

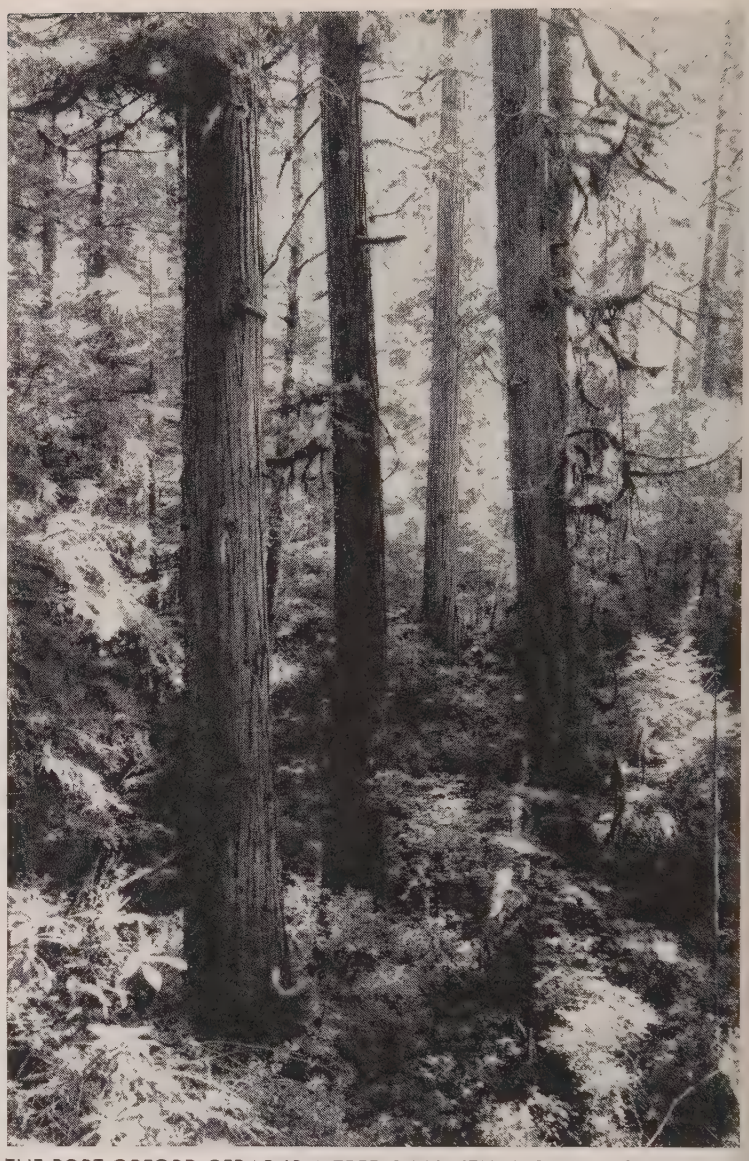
champion, but it has a greater diameter.

Honors for the second tallest species go to another Pacific Coast tree, the Douglas fir. What is doubtless the largest living specimen is one reported by the Long Bell Lumber Company. It is three hundred and twenty-four feet tall, thirty-seven feet in circumference, and stands near Ryderwood, Washington.

Harlow and Harrar in their *Textbook of Dendrology* say, "The largest known fir in the United States stood near Mineral, Washington, and was approximately three hundred and eighty-five feet in height and fifteen feet in diameter." If standing today, that tree would undoubtedly be the world champion, taller by twenty feet than the biggest redwoods. Although there are still some extremely tall Douglas firs remaining in the Pacific Northwest, it is unlikely that any so huge are now in existence.

Next in height to the redwood and the Douglas fir, which are so-called softwoods, the tallest species are the Australian eucalypts, which are hardwoods. The biggest one authentically measured was a mountain gum found on a spur of Mt. Baw Baw, Grippsland, ninety-one miles from Melbourne. On authority of the Victoria Forests Commission it is said to have been three hundred and twenty-six feet tall.

What is believed to have been the tallest hardwood tree in the world stood until January, 1939, in the Toorongo Forest, north of Noojee, Australia. It too was a eucalypt, *Eucalyptus regnans,* which was uprooted by the gales that accompanied the forest fires of January 13, 1939. When measured by F. G. Gerraty, inspector of forests, the bole was found to be three hundred and thirty-one feet long. This height was reached at a point three inches in diameter, where the top had been broken off.



THE PORT ORFORD CEDAR IS A TREE OF LIMITED DISTRIBUTION

Known to botanists as *Chamaecyparis lawsoniana,* this tree, found in southern Oregon and northern California, ranks in twelfth place among the large trees of the world

Unquestionably, the mountain gum of Victoria, New South Wales, and Tasmania is the world's third tallest species. The tallest living specimen stands in the Cumberland Valley, fourteen miles from Marysville, Victoria. It is three hundred and one and one half feet high, and is one of a group of very tall eucalypts now protected by the Forests Commission.

In Tasmania the blue gum and the stringy bark reach heights of three hundred feet. The *Australian Forestry Journal* reported a blue gum three hundred and eighteen feet high. These two probably rank as the fourth and fifth respectively among the world's tallest.

Sixth on our list is another American species, the bigtree redwood. Although it is not as tall as the coast redwood and the Douglas fir, it surpasses them in diameter. The tallest bigtree that has been reliably measured is one known as the Clothespin tree, standing in the Mariposa Grove, California. Its height is two hundred and ninety-three feet.

The spruces are generally mountain trees, but the massive Sitka spruce is a coastal species. One specimen, felled on Graham Island of the Queen Charlotte group, B. C., was reported to have been three hundred and forty feet in length. No living Sitka spruce, however, probably exceeds three hundred feet in height. Nevertheless, it can be said to be the seventh tallest.

Of our four native hemlock species, the largest is western hemlock of the Pacific Northwest. Its maximum height of two hundred and ninety-three feet makes it the eighth world's tallest tree.

Grand, or lowland white, fir in the southern part of its range in the Pacific Northwest, may grow to be 250 feet tall, and accordingly ranks as the ninth world's tallest.

Among the most magnificent trees in the world are the pines. The tallest is our native sugar pine. David Douglas, the first botanist to describe the species, reported a sugar pine in southern Oregon two hundred and forty-five feet tall. Few of that size have since been authentically reported, though the U. S. Forest Service has the record of one two

hundred and forty-six feet tall near the north fork of the Tuolumne River. On the basis of such records, the sugar pine is probably the world's tenth tallest tree.

The true firs or balsams, particularly those of the far Northwest, are generally big trees. Red fir may attain a height of two hundred and thirty feet, which qualifies it for the rank of eleventh world's tallest.

In the coastal forests of southern Oregon and northern California the well-known Port Orford cedar reaches enormous size—a maximum of two hundred and twenty-five feet, and the rank of twelfth among the world's tallest species.

The lovely silver fir in the Olympic Mountains of Washington, and the white fir of the Sierras, may reach maximum heights of two hundred feet and thus tie for thirteenth place.

Not all the honors for giant trees go to the West, however. Our eastern states produce at least one champion, the yellow poplar or tulip tree. It is the tallest hardwood native to the country. Individuals approaching the two hundred-foot mark have been found. It may be considered number fourteen on the list of world's tallest. Many Nature lovers call it not only the tallest of our native broad-leaved trees but the handsomest as well.

Lastly, one other broad-leaved tree should be included among our list of world's tallest—the northern black cottonwood. It is the biggest hardwood of the Pacific Northwest, and deserves fifteenth place on our list. Specimens close to two hundred feet tall have been reported in the Puget Sound basin.

The aforementioned species are reliably believed to be the tallest in the world. With the exception of the three eucalypts, all are native to North America. So, the next time you meet a tourist home from a foreign land who tells you of fabulous trees estimated, by the unaided eye, to be more than four hundred feet high, or when you read similar figures in a guidebook, remember that those four hundred-foot giants have a habit of shrinking when approached by a forester or a timber cruiser with a height-measuring instrument and a steel tape.

In short, the United States has the monopoly on size as well as on the number of tall species. Consequently, if you want to see the biggest trees in the world—the true kingly giants of our forests—be sure to see America first.

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The Strange Hornbill

By EDITH M. LAING

THE HORNBILL has two claims to fame—its peculiar bill, and its equally peculiar nesting habit.

In comparison with the size of the bird, the bill is tremendous. In the case of both tree and ground hornbills most birds have sprouting from the junction of head and bill an extraordinary horny excrescence. In some, this epithema, as it is termed, is solid, and in others is pitted with air cavities. From some, the natives carve ornaments.

Their food consists mainly of fruits, seeds, and insects, although the larger kinds also eat small snakes. The large white eggs are laid in a hollow tree. After the female has settled herself comfortably to the business of incubating, the male plasters up the entrance with mud, except for a small hole through which he serves her with food. There she stays until the young are partly grown. Thereafter both parents care for the young.

These strange birds are found in Africa, south-eastern Asia, and the Malay Islands. Of seventy known species, Borneo claims nine, and has pictured one of them on a stamp. Dr. Eric Mjöberg, the Swedish naturalist, who has spent many years studying the teeming life of that little-known savage country, says that flocks of hornbills come sailing over the forest "like air fleets, visible and audible a long way off." It must be quite a sight.

Unfortunately for one Borneo species, which differs in appearance from all others, it is eagerly sought by the Dyaks, who use its beautiful elongated center tail feathers to decorate their war bonnets, and its solid horny helmet to carve into ear ornaments.

The bird pictured resembles the one illustrated so long ago in *The Malay Archipelago* by Alfred Russel Wallace. If identical, then it is *Buceros bicornis*. Wallace described a young bird that he took from a nest along with the mother, as being the size of a plump pigeon, with completely naked, semi-transparent skin, so that it "looked more like a bag of jelly with head and feet stuck on than like a bird."

As with many other birds, hornbills are the object of superstitions. In time of drought, certain natives of South Africa believe that if the medicine man kills a hornbill and throws it into the river, rain will result. They say that the putrefying body makes the river sick, whereupon the rain gods send showers to freshen the stream and wash the polluted waters away to the sea. Another belief is that the choicest pasturage for cattle is where hornbills abound. Naturally the head men of the tribe see that the desirable areas are staked out for their own herds. Even among primitive civilizations dictators manage to harvest the plums.

A RETIRED HERO

By STEPHEN HAWEIS

FOR half a century I have been withholding a tale of bravery unwitnessed, and until now unsung or inscribed. How, then, do I know it is true? My blushing cheeks would tell you who the hero was if you were here at this moment—alone I did it, and I did it alone. How glad I was afterwards! I write about it now, with modest Corona, only because the story will be wanted for my biography, and time, I regret to notice, is moving right along.

The night was dark. There was no moon. No star could penetrate the dark green velvet canopy that great elms spread over the scene, an English country lane. A mere boy he seemed (and was), as he rode a bicycle, watching the road that was illumined only by glow-worms and a bicycle lamp, the one too faint to be effectual, the other too concentrated for any but its specialized use. Fifty yards ahead the youth suddenly saw another light, but no such light as he had ever seen before. It was a strange, unearthly star, greenish-white yet not scintillating, neither, as he drew nearer, was it still. It was a living thing, a ghost maybe, if the chill that encircled and spiralled down his backbone told the truth. Too brave to go back, too afraid to go forward, he dismounted to watch the manifestation from beyond the tomb. He extinguished the bicycle lamp. With chattering teeth he told himself that there were no such things as ghosts and that he'd as lief go through a churchyard at night as walk anywhere else, only, fortunately, there was always another way around.

This third person stuff is hard going. After all, I've told you I did it.

But are heroes afraid? Do their teeth rattle in the presence of danger? Yes, sir, they do. Mine did, and that proves it. To go forward instead of back, to be afraid and yet conquer, and so forth—that marks the true hero. It describes me as authentically as a birth certificate. Since it could not be a ghost, and since it moved with odd, spasmodic movements, I knew it must be a creature of some sort. Certainly there were luminous animals, beetles, fishes. Whatever it was I meant to find out, and, if possible, capture it. I was at the age when anything that cannot be caught with a piece of string must be caught in a school cap, so, with prayers and perspiration, I stalked the rare beast, flat on my waistcoat, an inch or a foot at a time, making no sound. Only my heart beat, wildly but not noisily.

My quarry had not even raised its head. I could tell by the arch of its back that it was feeding at the roadside utterly unaware of my coming; recking not of cricket-caps. An owl, realising that it was time it did something, hooted, and that did not make things any better for me. In my books an owl always said "tu-whit, tu-whoo," very discreetly. This one said nothing like that. The two most terrifying sounds in Nature—when you don't know what they are—are an owl's hoot and a donkey's bray.

After a few minutes I inched forward again. I ought to have known that when an owl hoots it is a sign of danger, disaster and general unpleasantness for humanity. Indeed, I did know that, but still I went on, as honest-to-goodness heroes do when they bring in a wounded comrade, or take a roll in their country's flag before they expire. I was doing this in the cause of science. I was discovering a rare, and perhaps unknown, luminous nocturnal animal. No doubt it would be called after me.

It was pretty bad going, and I sympathized with the serpent, which always has to travel that way, but the last-minute dash was worse. The beast might be poisonous, might bite or sting, as I was assured newts and adders did. In a few minutes I might be swelling up, and in agony, but still I kept on—brave fellow! A final plunge and I'd caught it.

Now it is one thing to catch something in a small cloth cap and another thing to get it out from underneath, especially if you don't know whether it bites or not. This thing struggled, and it was hard and almost thorny. It took me some minutes of close reasoning to decide what to do next, but the true Nature student thinks of a way in an emergency. It had an odd smell. I wondered if any English creature has that means of protection except the yellow-eared grass snake. Again, I did not know, but I was able to hedge my cap around with large stones and cover it with a piece of dead wood in such a way that the cap held the struggling prisoner (Continued on page 549)

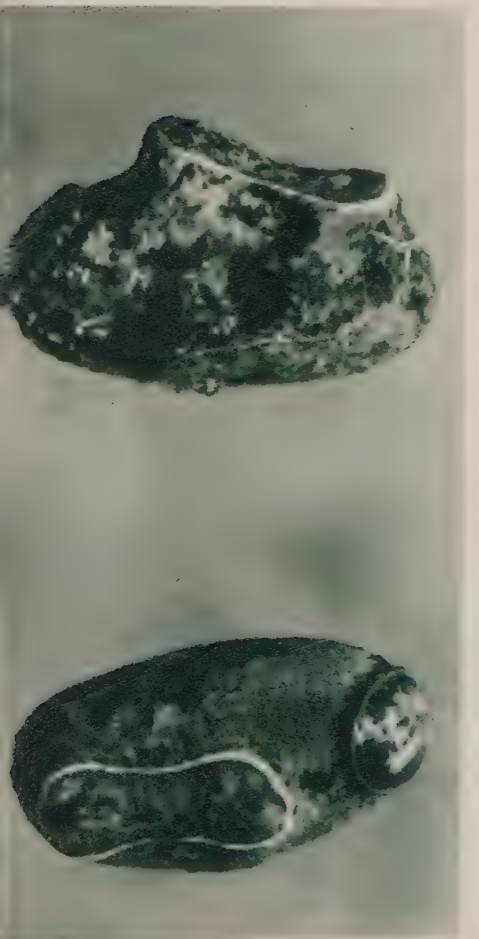
Walking-Sticks, Their Eggs and Young

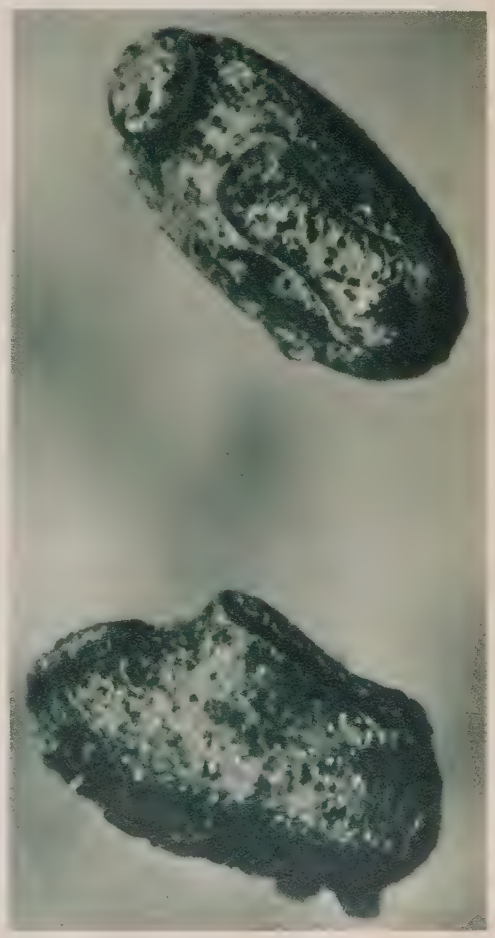
As recorded by Lee Passmore

Among the many species of insects having protective coloration and form there are few that have reduced it to a finer degree than the orthopterous insect commonly known as the walking-stick, a member of the family Phasmidae. Sixteen species are known by entomologists to be found in different parts of North America.

They are noted for their close resemblance to vegetable structures. Some appear like dried twigs, and so perfect is this resemblance that, until they move, they often remain undetected, even by the keenest observer.

Walking-sticks are also notable for being among the largest insects in the world. Some kinds attain a length



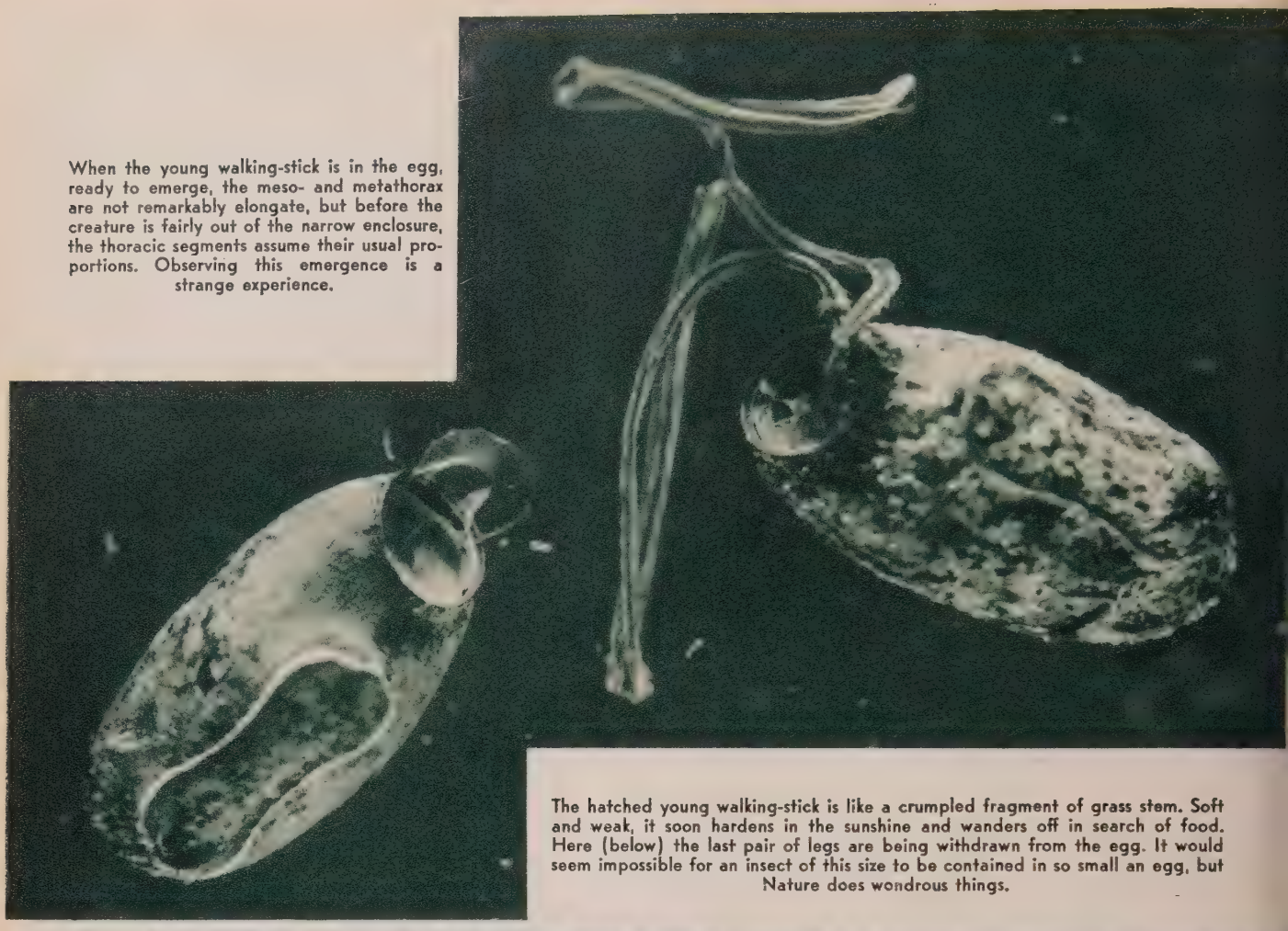


At the top of the page is a photograph of an adult female walking-stick of the species *Pseudosevmyle strami-neus*. This form appears in several of the western states. Resting on a dead branch, her ash-gray color and form harmonized perfectly with her surroundings. The length of this specimen, exclusive of its antennae, was three and one-half inches.

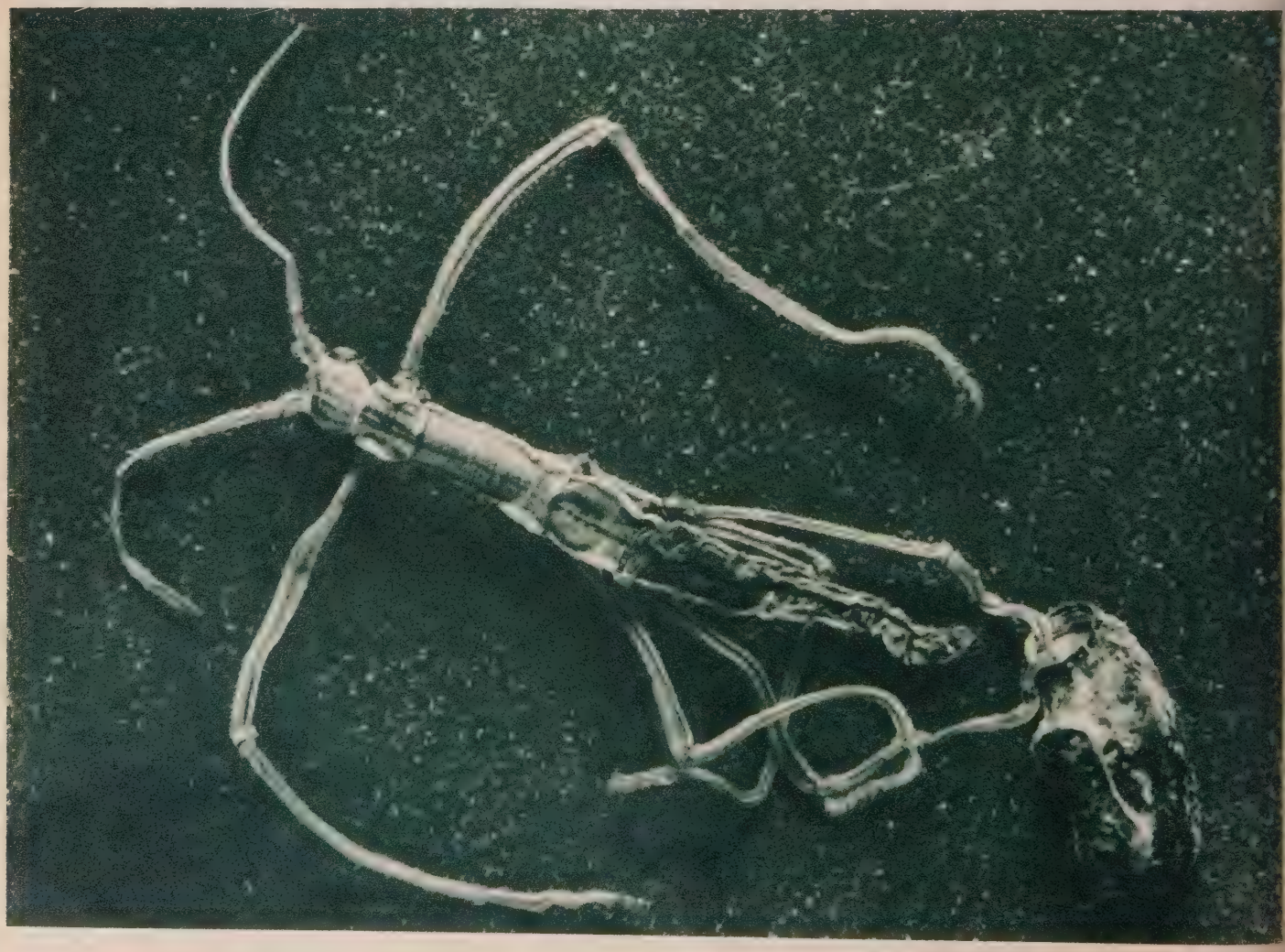
Left and right are eggs of the walking-stick insects. These are often remarkably sculptured, and, supplementing the protective form of the insects, bear close resemblance to seeds. Some are smooth and traced with wavy lines; others are bark-like. The eggs of each species seem to be quite distinct from the others.

The four eggs here were all laid by the female pictured above. They were laid in the first week in December and three hatched the last week of June. The fourth was apparently not fertile. A cap-like lid, called the operculum, surmounts the end of the egg. This is pushed off by the emerging insect. A second lid, called the micropyle, is situated on the top side of the egg and the fertilizing fluid enters through this. Actual length of the eggs is one-eighth of an inch.

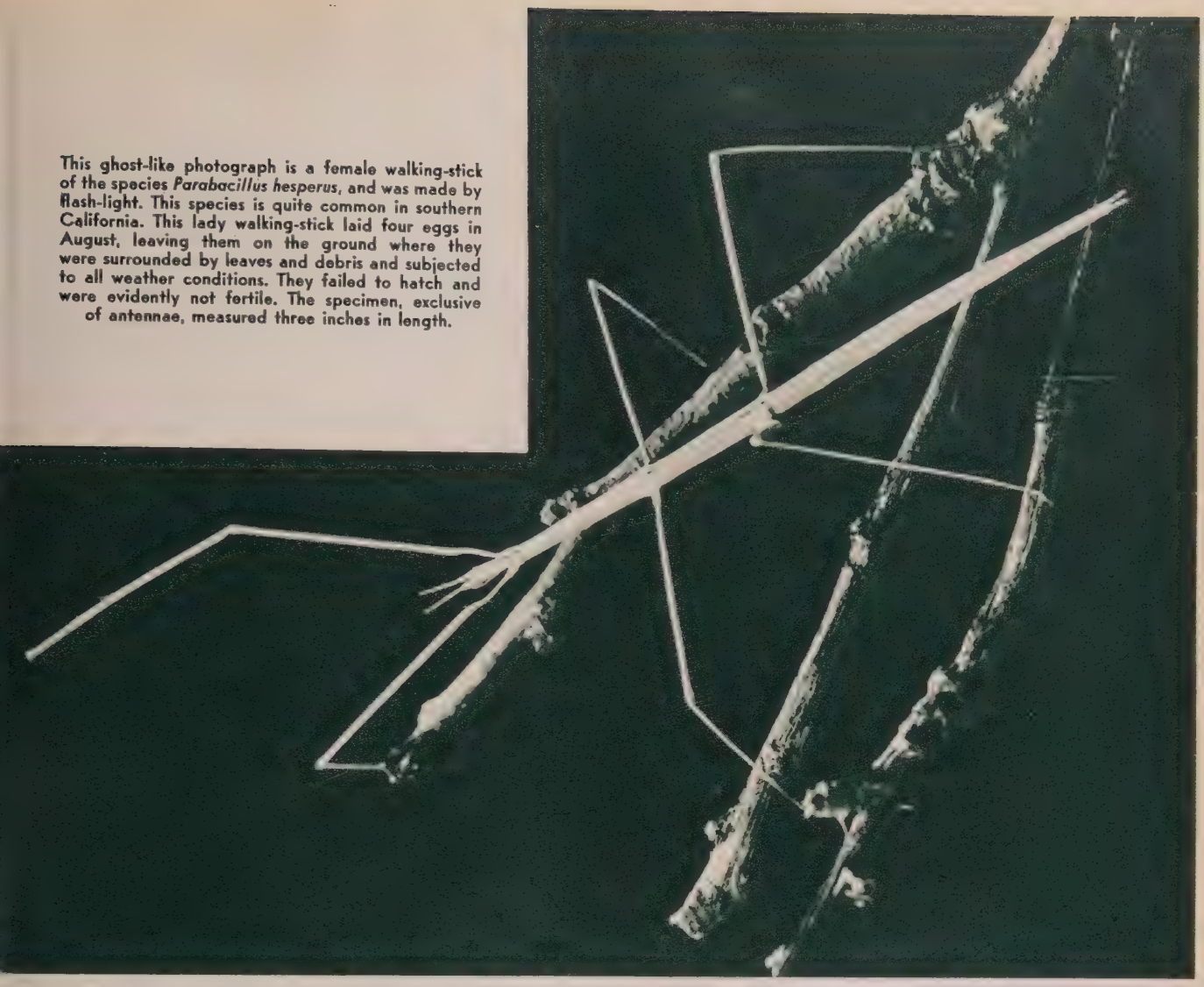
When the young walking-stick is in the egg, ready to emerge, the meso- and metathorax are not remarkably elongate, but before the creature is fairly out of the narrow enclosure, the thoracic segments assume their usual proportions. Observing this emergence is a strange experience.



The hatched young walking-stick is like a crumpled fragment of grass stem. Soft and weak, it soon hardens in the sunshine and wanders off in search of food. Here (below) the last pair of legs are being withdrawn from the egg. It would seem impossible for an insect of this size to be contained in so small an egg, but Nature does wondrous things.



This ghost-like photograph is a female walking-stick of the species *Parabacillus hesperus*, and was made by flash-light. This species is quite common in southern California. This lady walking-stick laid four eggs in August, leaving them on the ground where they were surrounded by leaves and debris and subjected to all weather conditions. They failed to hatch and were evidently not fertile. The specimen, exclusive of antennae, measured three inches in length.



The picture below is, of course, a much-enlarged photograph and was taken by flash-light. It illustrates several interesting features of the anatomy of the walking-stick insect. Here we see the head and part of the antennae, and the eye and mouth parts, of the insect shown in the picture above. Only a small part of the front legs could be gotten into this picture due to their relative length.

of more than ten inches, the largest being found in tropical regions. Those of the temperate zones seldom are more than five or six inches long.

Some walking-stick insects are wingless, others have delicate and beautifully-colored wings, which, however, are not conspicuous when the insects are resting. They fold fan-like, and lie close against the sides and thus do not change the lineal outline of the stick-like bodies.

A typical walking-stick gives rather the appearance of being made up of bits and pieces. The head seems ridiculously small for a creature of its size. Some have long and exceedingly slender antennae; in others the antennae are quite short and tapering. The legs are long, almost too long, it would seem, for convenience when walking on the ground. However, when seen in its natural environment in the trees and brush, where it crosses with ease from branch to branch, the insect's movements become rather graceful. It usually remains quite motionless during the daytime, but soon after sundown it suddenly becomes active.

Walking-sticks are herbivorous, and feed on tender foliage, often doing considerable damage to trees. A plague of the insects occurred in Pennsylvania during the spring of 1901, and it is recorded as being one of the most destructive in the history of that state. Vast hordes of walking-sticks, *Diapheromera femorata*, defoliated whole forests. They were found on all kinds of trees and

shrubs except hemlock, pine and dogwood. The oaks, chestnuts and maples seemed to be special objects of attack.

The males are generally smaller and more slender than the females. Oviposition takes place during the late summer and fall. The female drops the eggs, as they mature, from any position she may occupy at the time. Where they land, or how they develop, seems a matter of indifference to her.

The female exhibits no concern for the welfare of her young, not even showing the usual care of insect mothers in placing her eggs upon some food-plant that will form suitable sustenance for her offspring.

When the young insect emerges from the egg it is, of course, very small, but it is plainly recognizable as a walking-stick. It does not undergo a complete change in coming to maturity. In a few days after emergence it molts, or casts its outer skin. This is not the true skin, but a thin, firm covering or outer body-wall composed of a substance called chitin, which is secreted by the cells of the true skin. After the sixth and last molt, the walking-stick becomes full grown and mature. This takes about two months.

In the picture above are shown the antennae of the walking-stick insect shown on the preceding page. This picture is, of course, greatly enlarged and actually these antennae measured only three-sixteenths of an inch.

Below are the four cigar-shaped eggs laid by this same specimen of the walking-stick. The actual length of the eggs was one-quarter of an inch. In form they vary greatly from the eggs shown on the first page of this article, and illustrate the variations in the form of the eggs between different species of walking-sticks. The lid-like structures at the top of the eggs are quite similar to those on the eggs of the related species. The micropyles, however, are quite different.

Low to the ground, the bud makes its first appearance in the heart of the plant, perhaps with your lawn for a setting.

Within three days the bud has elongated slightly and the green, blossom-enclosing bracts give promise of an early opening.

THE LIFE OF A DANDELION

By I. G. HESSEN

Photographic studies by Clyde McClary

Few home gardeners can say that the dandelion is a stranger to them. Fewer, however, can give you any real information about it. It is true that the dandelion has been written about under such titles as "Bearding the Lion in His Den" and, lethally, "Gassing the Dandelion", but the average individual regards it as a scourge of the lawn and hates it accordingly.

Yet the dandelion has a beauty all its own, opening its rich yellow head in many an otherwise unadorned spot. It provides many a golfer with something to swing at, clipping off the head much more neatly than he clips the ball off the fairway. But the dandelion has other friends for other reasons, and there are those who actually raise it. In Salem, Oregon, for example, the dandelion is a commercially valuable crop. Its roots are used in compounding medicines; its leaves are sold for salads; its heads are turned into wine, and several thousand pounds of seed are gathered yearly to be shipped to eastern markets for the manufacture of dyes.

Dandelion, which comes from the French *dent de lion*, referring to the teeth on the leaves, travels under the scientific name of *Taraxacum officinale*. It is a native of Europe and Asia, but has become naturalized in all temperate countries—to some as an undesirable alien.

Some friends of the dandelion have suggested that it is entitled to the name of "lawn dahlia". There will be those to dispute any such right, but careful study of the weed's tenacity of purpose must inspire respect. In tracing its life cycle let us start with the plant in the bud stage. This bud appears in the heart of the plant close to the ground, elongating in about three days to open and reveal the brilliant yellow flowers. The dandelion is a member of the Compositae, and the flower head is made up of many blossoms—a sort of bouquet. The bees are attracted to the flowers and effect pollination, after which the head closes and the stem seems to lie over while the seeds mature. Then it straightens up and begins to lengthen out toward the sun and into the wind currents. The green bracts reopen to disclose the seeds, on their tiny, hairy parachutes, ready to sail away on a puff of wind. From bud to deposited seeds takes about thirty days.

An established dandelion plant produces two mature seed heads a week, each head bearing more than 125 seeds. As the plant is a perennial, and, in favorable climatic conditions, may flower and seed the year around, it has possibilities of 12,000 seeds a year. No wonder it has enemies! It seeks to "people the earth."

The bracts straighten up with the urge of the flower inside, and the blossom begins to reveal the rich gold within it.

The bracts yield to the demands of the flower, which is, in fact, a sort of bouquet because it is made up of many blossoms.

Then the head is fully open and the plant is ready for pollination. Note the resemblance to dahlia and aster, also Composites.

The visiting bees have done their part and the flowers have withered. The bracts control things again and close up, awaiting maturity.

Inside the flower head Nature has performed one of her many fascinating miracles, and now the bracts yield slowly once again.

Rapidly, now, the seed-filled head opens to reveal the tiny, hairy parachutes to which the matured seeds are attached for flight.

The dandelion head in its full glory, really a lovely thing were it not for the certainty that many seeds go forth to infest the lawns.

And thus the cycle is over, two tenacious seeds alone remaining to await a little stronger breeze than has yet come to lure them away.

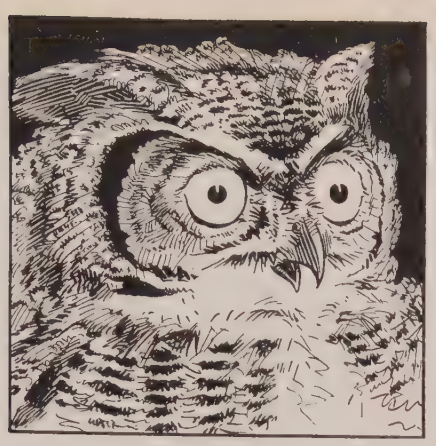
An Albino Buffalo

By W. PEYTON MONCURE

While albinism is not a rare occurrence among many animals, it is always striking. However, true albinos among buffaloes seems to be a more rare event than with other mammals. For this reason particular interest is attached to the white bull born in 1933 on the National Bison Range at Moiese, Montana. The son of normal buffalo parents, this individual departs from the usual only in having red eyes, white coat and the striking dark patch on the top of his head.

There is a report of another albino buffalo in the herd roaming in Alaska, a herd that was started with twenty-three animals shipped there from the National Bison Range. There are two positive records of white buffaloes during the past century and the Indians tell of a few.

As We See It



HIGH SCHOOL TEACHING ★★

"The schools of the United States have in recent years become very conscious of the necessity of greatly expanding their program of instruction in the social studies if they are to provide an effective education for citizenship in a democracy. The major social study which is now included in the programs of the great majority of schools is history. History as usually taught is a chronological account of happenings remote from the environments and lives of pupils. Emphasis has often been on ancient history and on the mere mechanics of government to the exclusion of instruction on modern problems and on the fundamental concepts of social organization. . . . Furthermore, explicit instruction in the facts and principles of economics, politics, and the problems of community life and government has only recently been given a prominent place in the curriculum.

"The difficulties that are encountered in cultivating intelligence about social problems can hardly be overcome by individual schools or individual teachers. There must be a concerted effort on the part of the whole teaching profession if a more effective program of social studies is to be accepted as a part of the curriculum. A long list of topics which should replace some of the material now used in many history and civics courses can be set down on which young people should be able to form wise judgments based on knowledge of the facts. A few examples of such topics may be given: housing, conservation of natural and human resources, community planning, cooperatives, pressure groups and their methods of influencing legislation, the stock exchange, corporations, labor organizations, the industries of the nation, various forms of municipal government, governmental services such as those of the Departments of Agriculture, Commerce, and Labor, the origin and nature of money and systems of exchange, international relations, consumers' needs, and investments.

"The one fact about the social studies that is altogether certain is that there must be far more instruction in these fields than there has been in the past. When community life was comparatively simple and parents could speak with assurance on the topics of public interest, young people were given by their parents a fairly adequate view of their civic rights and responsibilities. As the range of social contacts has widened and the social order has become complex, community life has become more difficult of comprehension through mere observation or through discussions around the dinner table. The obligation of finding some way of preparing young people for citizenship, for intelligent social attitudes, and for effective participation in community life has become a public obligation which must be met if social chaos is to be avoided."

The foregoing paragraphs are quoted from an important and provocative report, entitled "What the High Schools Ought to Teach," made by a distinguished committee of the American Council on Education to the American Youth Commission and other cooperating organizations. In these times, when democracy is threatened, and when the question of proper preparation of future citizens for their responsibilities is of vital importance, this report merits the most careful consideration of school authorities.

We have quoted these particular paragraphs because we feel that they bear upon an issue of outstanding importance. We have heard much of late of the need of teaching the fundamentals of conservation in the schools. There can be no question of the need, because conservation and wise use of these resources are one with the future of America. Most educators do not quarrel with this contention, but, in the face of varied demands for additions to the school curricula, are often at loss to know just how this educational activity may be accomplished.

Conservation education has been added to the curriculum of at least one state by legislative order. The merits of such a method still remain in doubt. Elsewhere it has been added to the courses in teacher training schools—a most desirable and logical method. Those educators who have given thought to the matter, however, seem to feel that conservation education can most effectively be worked into existing studies. General science and social studies are the courses usually regarded as most appropriate for integration, with some possibilities in other studies. Bringing conservation thought into school texts, however, takes time, and there should be as little delay as possible.

In view of these considerations, then, the observations of the committee of the American Council on Education are much to the point. From the committee's listing of proper topics to be included under the general heading of "social studies" one would gather that this course might well become an overloaded one; a sort of curriculum catch-all that would give high school students a superficial

inkling about a lot of important things and leave most of them generally confused. This need not be the case with properly-prepared texts and teachers. All of the things now taught as "social studies," and all of those suggested in the report under discussion, are interrelated. In fact, virtually all of them are closely related to natural resources. Certainly geography and history are intimately concerned with them, and such diverse things as housing, international relations, industry and community planning are dependent upon natural resources.

There is nothing new about this. Everyone who stops to think recognizes the interrelationships. The difficulty seems to be that many people, including educators, have not been able to realize the importance of conservation in relation to these resources. This is, no doubt, natural in a country that has been lavishly endowed and correspondingly profligate. The days of profligacy are over, however. We now live in a disordered world, and the wise—the conservative—use of that with which Nature endowed us is essential if we are to bring order into it.

In this the schools have both a responsibility and an opportunity. Educators should lend an ear to constructive criticism and suggestion both from within their ranks and from without. Coming as it does from fellow educators, we trust that this report will not only receive the attention it deserves, but that it will bring about corrective action.

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The cartoon strip reproduced herewith, in which Joe Palooka yields to an irresistible impulse that would affect many people the same way, appears through the courtesy of the McNaught Syndicate, and the artist, Ham Fisher.

JOE PALOOKA
McNaught Syndicate Inc.
By HAM FISHER
SHALL WE GO INTO THE DEN? I'D LIKE TO SHOW YOU SOME OF MY SPORTING TROPHIES.
SWELL. WE KIN TALK ABOUT THAT DEAL YA WANT US TO INVEST IN LATER.
8-25
SAY WHILE YOU'RE SHOWIN' JOE AROUND D'YA MIND IF I SNEAK A LITTLE NAP FER A FEW SECONDS? THAT WINE MADE ME SLEEPY.
GO RIGHT AHEAD.
I DINT KNOW YOU WENT IN FER SPORTS. WHAT DID YOUSE PLAY-GOLF, TENNIS, HOCKEY, BOXIN', ER--
ALL TOO TAME M'BOY. HAW! HAW! CHILD'S GAMES.
I GOT THIS FELLOW FROM A WINDOW SHORT WAY OUT OF ZAMBESI---THE CONDUCTOR STOPPED AND WE PICKED 'IM UP---COME ALONG.
WITH ONLY FIFTY BEATERS AND FIVE GUN BEARERS I BAGGED THIS WHOLE GROUP. NEVER WENT A DAY WITHOUT KILLIN' SOMETHING. SOMETIMES KILLED FIFTY IN A DAY.
COURSE I DIDN'T SAVE ALL OF 'EM. BEASTLY NUISANCE MOUNTING ANYTHING BUT THE BETTER SPECIMENS. THERE WAS A STUPID BEG-GAR--
GAVE ME NO SPORT AT ALL. JUST STOOD AND LOOKED AT ME. TRIED TO MAKE 'IM RUN BUT HE WOULDN'T. HAW! HAW!
GOT THIS FELLOW FROM A BOAT IN THE UPPER NILE. HE WAS SWIMMING WITH SEVERAL OF HIS FAMILY, KILLED 'EM ALL--BUT ONLY KEPT HIM..
AMAZIN'! UH--HOW IS IT THERE'S NOTHIN' ON THIS SPOT.?
OH SAVIN' THAT FOR A BOAR. NEVER HAD THE LUCK TO GET A BIG PIG. I'LL JUST KEEP SHOOTIN' 'EM TILL ONE SUITS MY FANCY.
MMM!
WHAT TH'--WHAT HAPPENED-- WHERE'S JOE ??
McNaught Syndicate, Inc.
--AN BESIDES THAT YA RUINED OUR DEAL---YA-- YA SAP.
I DON'T KNOW WHAT HAPPINED T'ME KNOBBY--BUT I JIST COULDN'T HELP IT.
HAM FISHER

AN APPROACH TO THE WATERWAYS OF UPSTATE NEW YORK
A billboard intrudes, clashing with the natural beauty of a region that many thousands of visitors come many miles to see every year. This board is, at the moment of going to press, now blank, but is still in this location awaiting a customer

Billboards' Hobby Lobby

What happened in New York State in 1940 is an example of how the industry flouts public interest

By H. A. ENZER

BEAUTY lies in the hills and valleys and streams of New York State. Last year nearly 9,000,000 visitors came to appreciate those natural scenic resources, and they remained to spend more than $400,000,000 during that one year. Beauty is no minor economic item.

Forest preserves of 2,400,000 acres, containing free public campsites, hiking and skiing trails; almost one hundred large and small state park systems; innumerable vacation resorts, and the World's Fair were among the attractions offered these outdoor people from all over the world by the Empire State—the richest state in the country.

With election day not far away many people are asking the candidates for seats in state legislatures how they stand on the issue of surrendering the rural landscape of America to the billboard industry. This is a question upon which many legislators will be called upon to act in the immediate future. In the accompanying article the reader will find an objective and factual analysis of the pressures that will be exerted upon law-makers by the lobbies of the billboard industry.

But beauty is not yet "queen in her own right" in New York State. Thousands of desecrations in the form of billboards and fly-by-night structures line the 54,000 miles of paved highways maintained by the state and its counties and towns. Last year two million pamphlets were sent out by the state publicity bureau, inviting visitors to come and see the beautiful wonderland. But those pamphlets did not mention the billboards that were also part of the scenery.

New York State wants to attract appreciative visitors to its scenic byways upstate, as well as to New York City with all its allures, and yet the state has been unable to protect its natural beauty from disfiguring billboards and roadside structures.

The people of New York, together with the national motoring public, annually spend more than $90,000,000 in building and maintaining New York State roads. But the legislature at Albany has failed repeatedly in its yearly attempts to protect this huge public investment in making New York the "playground" of the country.

The reason for the present lack of state control over its rural roadsides may be found in one of the most effective pressure groups in the United States—the outdoor advertising companies. So subtle is their organization that the failure of billboard legislation in the past is attributed largely to the alleged opposition of small farmers in rural areas, and to the disapproval of labor in urban areas. This "local" pressure has frightened many legislators into a state of passive resistance to any kind of regulation of road signs.

The billboard companies' lobby has found a happy hunting ground in New York State. No other state in the Union has been so completely and effectively sabotaged

THOMAS C. DESMOND

New York State Senator who, during ten years in the legislature, has sought reasonable roadside control. At the right is a view of the Adirondacks—defaced by billboards that do not belong there

in its efforts to obtain a billboard control law.

The story of the 1940 fight for billboard legislation is amazing evidence of how the billboard lobby "inspires" a campaign of opposition from the upstate New York farmers, and how the fear of political repercussions among state legislators themselves has impeded legislative progress in the great state of New York.

Following the introduction of major billboard control legislation at the recent Albany session by Senator Thomas C. Desmond of Newburgh, and Assemblyman Dutton S. Peterson of Odessa, "protests" were sent to all members of the legislature from "local" voters. One typical letter read in part:

"Farmers are protesting against this bill. They need all the money they can get off their land. That's what they bought it for. And this bill, if passed, will take money from their pockets. Signs help them as the farmer's situation at this time is critical. Beautiful sights and taxes don't appeal to them now."

One or two letters like this, or even more, might be considered a proper and sincere protest, but thirty or forty letters, each using identical phrases about "taking money from their pockets", indicates that something is "rotten in Denmark".

Such a protest from what seemed to be the representative farmer group in New York State did not quite make sense. There are 18,700,000 farm acres in New York. Not all of this land, nor the important "highway frontage" on this land, is owned by farmers; nor do all the farmers tolerate billboards. Approximately one-sixteenth of the farmers get revenue from rental of billboards to paying companies. The other fifteen-sixteenths get nothing and would lose nothing if all billboards along state highways were removed.

Even if legislation, like the Desmond-Peterson bill, had passed, most of the farmers getting income from signs would have continued to receive their rentals because the chief effect of the legislation was to set back or relocate billboards and not to eliminate them.

It was evident from the similarity of the protesting letters, and the later evidences, that Farmer Jones and his wife were being used to add their significant voices against legislation being considered in Albany. With the good, solid citizens "back home" to add weight to their cause, the billboard companies had little to fear.

Farmers have a keen sense of values. They would be among the first to recognize the fact that no revenue would be derived by anybody from billboards were it not for the public's investment in roads.

But what will any normal, hard-working man do if he is advised by persons "looking out for HIS interests" that if he doesn't defeat the billboard law (of which he has only the haziest idea) "every sign on his property will be removed", and even more drastic regulation of his personal life and property will result. He will do everything in his power to prevent such an eventuality.

The billboard companies in 1940 obtained the support of New York farmers not through facts but through fear. In their literature and personal interviews they pointed out the great financial losses that were seemingly threatened by proposed legislation for billboard regulation.

Without knowing all the facts, and misled about others, farmers hastened to write to Albany, protesting, in effect, against the public welfare, against beautification of the State, against the improved sightliness of New York, which eventually would mean more tourists and more money to individual farmers and businessmen.

The billboard lobby worked like a lever, raising a heavy boulder of small but strategic public sentiment to block the progress of the entire State.

The legislation introduced by Senator Desmond and Assemblyman Peterson was the result of careful studies of recent laws in California, Virginia and Massachusetts, and was prepared with the help of the National Roadside Council.

The bill incorporated a new feature in regulation for New York State—roadside zoning. Under the proposal the Department of Public Works was empowered to prohibit signs in areas zoned as rural or residential, with great flexibility allowed for the first two years of trial.

Despite the willingness of the sponsors of the bill to make any reasonable compromise in order to secure passage of this fundamental law, the inspired attack from the hinterlands continued during consideration of the bill.

One well-known oil company, which uses considerable roadside advertising itself, sent a form letter to its local distributors throughout the state, advising them to protest against the Desmond-Peterson bill. This form letter baldly and quite inaccurately prophesied:

"If either of these bills is passed it will mean that every sign on your property will have to be removed and you will lose the rental you are now receiving from these signs. It will also mean that the same group of æsthetic reformers who are pushing these bills will try to get through other highway zoning legislation which will prevent you from having anything on your land . . . which doesn't meet with their ideas of beauty."

To facilitate making protests the company gratuitously enclosed a list of members of the legislature, together with two three-cent stamps. A self-addressed reply card was thoughtfully enclosed, also, so the local distributors could inform the oil company to which legislators "protests" had been sent.

SAW MILL RIVER PARKWAY

The famous parkway system demonstrates what can be done by zoning and regulation. At the left is the approach to Fishkill. An official traffic sign can be seen if one looks closely. This is dangerous

Such thorough-going lobbying bore fruit. Within three days after this letter was sent out, a flood of angry letters to Albany followed. Most of them repeated the same phrases used in the form letter.

The simplicity, or duplicity, of this reasoning must have occurred to many of the legislators who received these letters. But they felt impelled to listen to these earnest protests from their "constituents".

With its local agents helping in the campaign, the oil company gave valiant assistance to the pro-billboard lobby. Most of the small businessmen who had contracts with the oil company added a sympathetic voice against any kind of regulation. Their sisters and their cousins and their aunts joined in the chorus, too.

Most of the local distributors who protested were owners or operators of small gas-filling stations and roadside eating places. For the most part they protested because they were instructed to do so by the hand that feeds them. In reality they had nothing to lose and much to gain by billboard regulation, for the beautification of the roadsides

ON THE WAY TO NEW YORK CITY OVER U. S. ROUTE #9
Even in winter this is attractive rolling countryside where billboards invade the foreground against a background of hill and forest scenery

and the cleaning up of confusing, garish signs will do much to aid these small businessmen who get their living from the people who use the highways.

The fact that anti-billboard forces represent no special interest, no profit-seeking groups or organizations, but are unselfishly seeking to better the entire state puts the opposition, whether "inspired" or sincere, into the category of obstructionists.

It is highly significant that during the 1940 legislative session labor groups took no steps to oppose the Desmond-Peterson bill. The powerful New York branch of the American Federation of Labor did not adopt any resolution against billboard regulation at its annual convention, although it never had failed to do so in previous years.

The claim that billboard legislation would throw people out of work was omitted from this year's propaganda in letters, pamphlets and articles. The legislation in 1940 sought a reasonable kind of regulation through rural zoning, which even billboard companies have agreed would be a desirable solution. With zoning regulation in New York State no legitimate outdoor advertising company need fear that it would be legislated out of existence.

However, with the good citizens of upstate New York blindly aroused against the Desmond-Peterson bill, the billboard companies prevented this bill from being reported out of committee.

Another milder bill, called the Griffith-Wright bill, was then introduced. The strongest provision of this proposal provided that billboards be prohibited from any road, or portion of a road, designated by law as a scenic highway. That meant that every locality in the State desiring to regulate road signs would have to secure an enabling act from the legislature. Even if local laws could have been passed under this bill, the scope of the measure would have been very limited. Nevertheless, emasculated as the bill was, legislators feared that it too would anger their farmer constituents. The bill was defeated by a decisive vote in the Assembly. It never got a hearing in the Senate.

Before the Griffith-Wright bill was killed, however, this pallid legislation was thus awesomely described by one outdoor advertising representative:

"The bill is one of the most discriminatory ever introduced . . . it is a ghastly thrust at the very existence of our type of advertising business."

Whatever type of advertising business that was it must have been pretty ghastly itself. Neither the very mild bill nor the reasonable Desmond-Peterson bill sought elimination of legitimate advertising business.

New York State's 1940 fight for billboard regulation proved that neither mild legislation nor super-mild legislation could win over the billboard powers and break up their subtle lobby. Yet state control over the use of its own roadsides is inevitable. A fundamental, but flexible roadside zoning law, like the Desmond-Peterson bill of 1940, on which organizations like the Roadside Council can concentrate their support, is the legislative solution.

The sense of civic beauty which the World's Fair has awakened throughout the state may quicken such legislative action. Governor Lehman in his 1940 message said:

"I cannot conceive that there should be further delay in the enactment of legislation which will so greatly promote the well-being of the vast majority of our citizens. Neither the billboard industry nor the self-centered property owner should longer be allowed to delay it."

In the near future other legislators, in addition to the sponsors of the bills at Albany, may be willing to risk the alleged opposition of their "aroused" constituents. The legislators may wake up to the fact that the righteous indignation of the folks back home can be turned on and off like water from a faucet by the clever billboard lobbyist. Unfortunately, the public is not yet fully aware of the difference between facts and fancies. In 1940 the fairy tale that billboard regulation meant being hamstrung by the government was part of the misleading propaganda that helped defeat billboard legislation.

In 1941 the Public may outgrow that fairy tale.

Playing Indian

By GEORGE E. MOORE

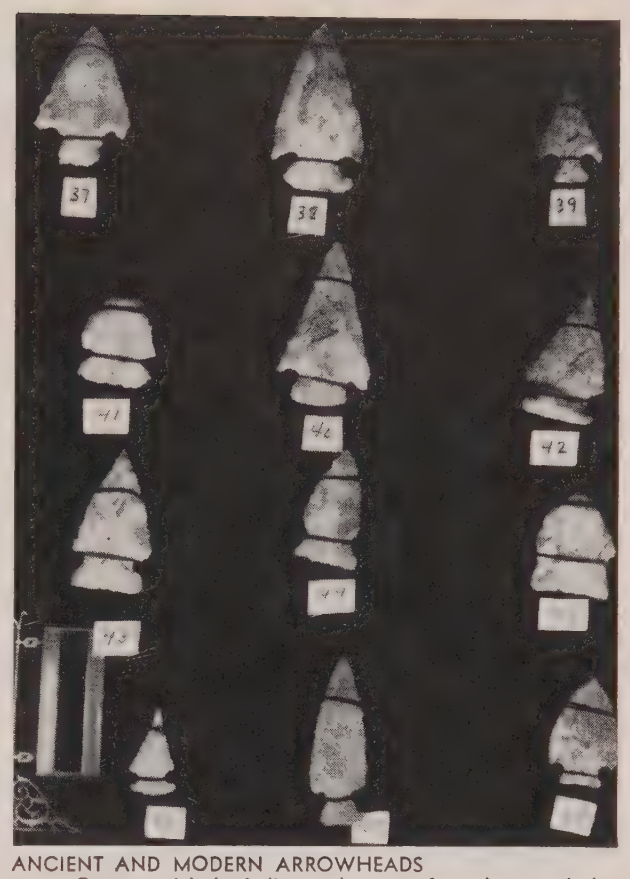
THERE ARE a number of popular misconceptions regarding stone arrowpoints. The average person will say that Indian arrowheads are made of "flint". A geologist would prefer to call the material chert. Most of the ancient points picked up in the Ozark region are of this material, and a great deal of it came from deposits of particularly fibrous chert—novaculite—in Arkansas where Indians quarried the material. I have found some points made of quartzite, a gray stone that sparkles with broken grains of quartz when worked. In many places in the West, volcanic glass—obsidian—was a common material.

There is also a general idea that making these points is a lost art. When I showed a few of my own make word got about and various groups, looking for entertainment, asked for demonstrations. The fact that the points were rather quickly and easily made created more astonishment than any of the hobbies I have sprung on unsuspecting acquaintances. At one such gathering I passed about a collection of some forty specimens of my own make, including one of Indian make, offering to give the choice of the collection to anyone who could pick out the Indian point. Those selected included almost all the collection excepting the right one. An observant person might detect recently-worked stone, but with practice one can equal the Indian workmanship. In fact, the ancient points show wide variation in quality of workmanship, as well as in size and form.

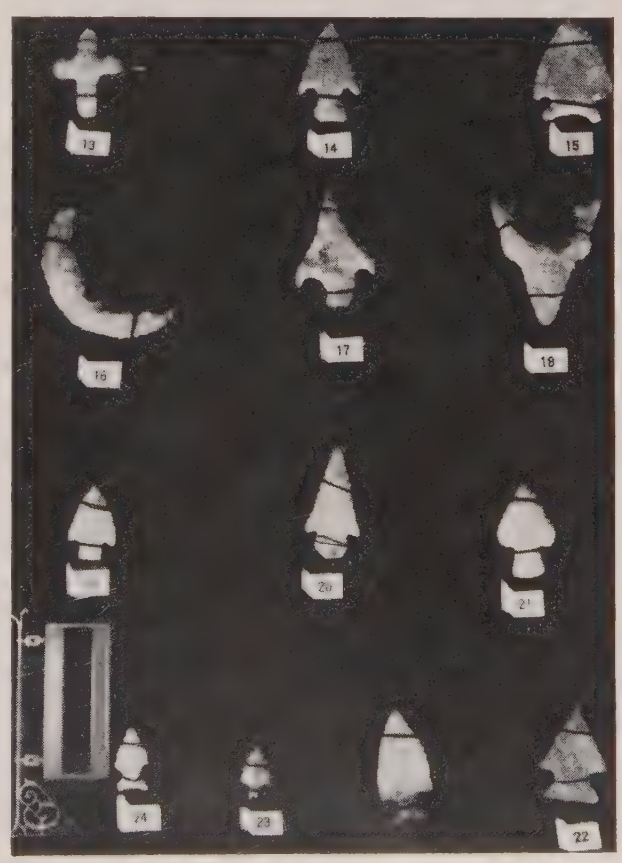
There is a general idea that the Indians made these points by heating the stone and dropping water on it to remove flakes. A recent magazine article told how arrowpoints were made by this method. But the article was illustrated by a photograph of a museum set showing a group of Indians busy at the work but working the stone cold by percussion and pressure. A good article on the subject, contributed to an early issue of the *American Anthropologist,* by an eye-witness of arrowpoint making by the Indians, makes no mention of the fire and water method.

A letter to the Crow Indian Agency in Montana brought the reply that the Indians of that region had not made stone points for many generations. Even the old Indians at the agency did not know how it was formerly done. "So far as the Indians here are concerned," the letter stated, "it is a lost art. However, you should heat your stone very hot and drop water on it with a straw."

My own experience makes me sure that the Indians did not use this method. I have heated many pieces of stone, some of the ancient points themselves, and, while heat disintegrates the stone, dropping water on it does not remove flakes. Large pieces of stone may be broken up by percussion to obtain rather thin blanks. These blanks may then be worked by removing small flakes from the edges with a hand tool, by pressure. The piece may be wedged in the crack of a log, as the Indians probably did, or held in the fingers with one edge slightly projecting over a block of wood, table, (Continued on page 547)



ANCIENT AND MODERN ARROWHEADS
Can you pick the Indian-made points from those made by the author? The Indian points are 42 and 45. Below, various designs that may be made from the stone



Conservation Comment

Most appropriate is the dedication of nearly a million acres of wild and rugged back country on the Continental Divide in Montana to the memory of the late Robert Marshall. Located in the Flathead, and the Lewis and Clark National Forests, this wilderness area will be known as the Bob Marshall Wilderness Area, as a tribute to one who led the movement to preserve areas within our National Forests in primitive form, that we might hand on to posterity regions unspoiled by man.

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Great Smoky Mountains National Park officially joined the National Park family on Labor Day when it was dedicated at ceremonies featured by an address by President Roosevelt. Although this Park, which preserves the greatest mountain mass in the East, has been functioning as a park for some years, the dedication marked the completion of formalities of transfer of title and acquisition of property. Much of the area will be accessible only by trail, but an excellent highway carries the visitor through it from Tennessee to North Carolina. More than one million visitors will have seen the Park during 1940.

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Arapaho National Forest in Colorado bids fair to become an outstanding memorial, and to give recognition to the conservation interests of at least two organizations. In August the Colorado Daughters of the American Revolution dedicated a sixty-acre tract of planted trees within the forest to the memory of the late Mrs. Clarence H. Adams, former State Regent of the D.A.R. Earlier in the month the United States Forest Service honored the Camp Fire Girls of America for their valuable conservation work nationally by dedicating to them a recreational area. A bronze memorial tablet was placed on an ancient boulder at Arapaho Viewpoint, about eighty miles northwest of Denver. On this is the inscription: "Dedicated to the Camp Fire Girls whose work in forest conservation has helped direct the attention of American youth to the importance of their country's trees and soil."

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Wireless reports from Canada's annual reindeer roundup show an increase of 1486 fawns in the Dominion's herd, bringing the total to more than five thousand animals. This herd is on the Reindeer Reserve, and the roundup is staged on the summer range on Richards Island, a short distance off the Arctic Coast. The herd began with 2370 animals delivered from Alaska in 1935.

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The Fairhope, Alabama, Chamber of Commerce must be an untrammeled organization not under the thumb of the busy billboard industry. At any rate, it recently unanimously adopted a resolution declaring that "a large part of the beauty of Baldwin County is its roads, which belong to all alike" and that "these roads are much defaced by obtrusive signs." The Chamber called upon the county commissioners "to stop the defacement of highways by advertising signs by giving public notice to this effect and by instructing road crews to remove said signs wherever found upon public roads so that the attractiveness of Baldwin County to present and prospective residents and visitors will be enhanced."

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For years Michigan has had a law forbidding the transportation of assembled firearms in vehicles. They must be "knocked down" and in cases, and thus in no condition for immediate use. It would be well if such a law prevailed in every State. It is most easily enforced, requiring only occasional halting of vehicles for inspection by traffic, or other, officers. Enforcement is useful not only in the general interest of wildlife but of even human conservation. Adopted in the West, where there is a habit of former, but of no present, validity of carrying firearms ready for use, it would stop the illegal killing of mourning doves along roadsides and the indefensible slaughter of Swainson's and other useful hawks that habitually perch on telephone poles, as well as the deplorable practice of making a target of almost any wild creature so unfortunate as to expose itself.

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Some twenty states are now carrying on conservation education programs of some sort, and in recognition of this trend the Conference on Conservation Education and Publicity was quietly formed three years ago. Annual meetings have been held to discuss various phases of conservation education and to exchange ideas, the most recent meeting at Pigeon River State Forest in Michigan. The present officers are Townsend Godsey, Missouri, president; James L. Bailey, Tennessee, and W. T. Calhoun, Wisconsin, vice-presidents; Leo Luttringer, Pennsylvania, secretary-treasurer.

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On September 17 the 100,000th hawk to pass over since the establishment of Hawk Mountain Sanctuary near Drehersville, Pennsylvania, was recorded by observers. The hawk did not linger for any ceremony, however. The 1939-40 annual report of the Sanctuary Association records an increasing number of visitors and a healthy financial situation. It also brings the welcome information that the road to the sanctuary is now in good condition. The achievement of this example in wildlife protection during the brief history of this sanctuary is notable. For details write to Mrs. C. N. Edge, 724 Lexington Ave., N. Y. C.

FLOWER OF AUTUMN

Some call them "Mums" —all call them beautiful

By ANDREW S. WING
Garden Editor of Nature Magazine

PHOTOGRAPH FROM DREER
A GROUP OF KOREAN HYBRID CHRYSANTHEMUMS

PHOTOGRAPH FROM DREER
"PINK SPOON", AN INTERESTING NEW TYPE

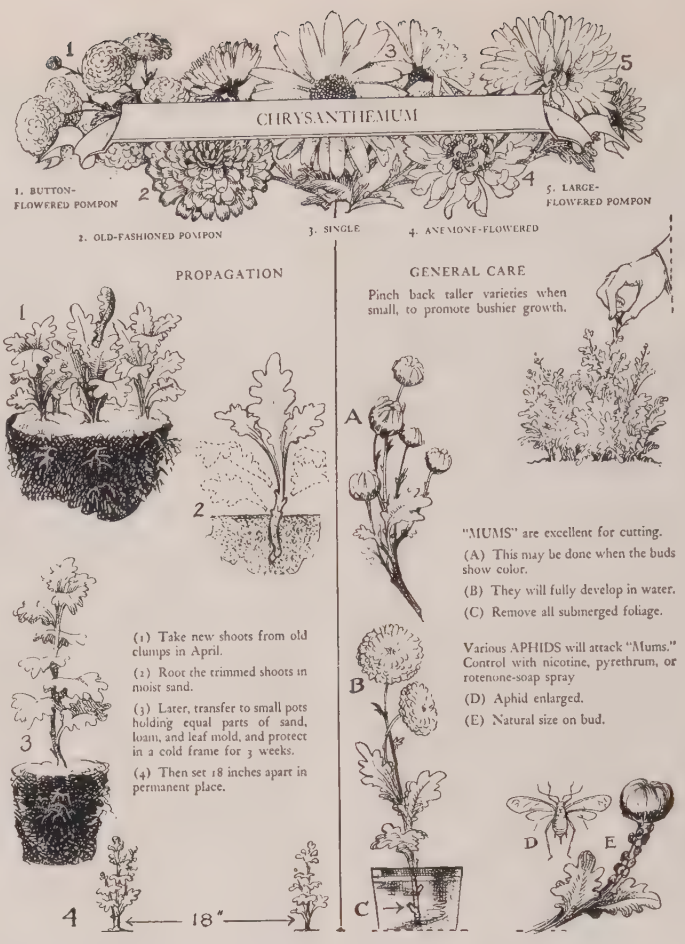
LONG revered by the Chinese and Koreans, national flower of Japan, admired by all who know them, members of the chrysanthemum family have spread over the earth. They know no national boundaries. Numerous species are naturally beautiful, and more than a thousand years of scientific breeding has created thousands of cultivated varieties of many shapes and colors. Yet it remained for American plant breeders to bring them to hardy perfection for outdoor gardens.

What associations we all have with this many-hued, pungently fragrant plant! Perhaps we first met them in grandmother's garden on the farm, where bright yellow, mahogany, or white flowers lingered bravely on long after frost had nipped tenderer garden associates. Or they recall football days, with comely coeds proudly flaunting giant pompons along with college pennants. In more recent years we have admired hardy borders with masses of gold, red, bronze, or more subtle shades that rival autumn foliage in brilliance. One does not need to be a gardener or a flower fancier to have a soft spot in his heart for the chrysanthemum.

The recorded history of the chrysanthemum goes back at least to the Fifth Century A.D., when a Chinese scholar (scholars in China were often gardeners as well as philosophers) created so many new and beautiful varieties that his home town became known as Chu-hsien, or Chrysanthemum City. Before many years the Japanese, always influenced by Chinese culture, took up the growing of chrysanthemums, and in 910 A.D. Emperor Uda named it the national flower of Japan, and held the first flower show in his own royal palace. Ever since those days, the Japanese have continued to create new varieties and forms, many of which have been imported into Europe and America.

Although Oriental in origin, so lovely a flower could not long remain undiscovered by early plant explorers

after the penetration of the Far East by European navigators. Those who read the book, *Mutiny on the Bounty,* or saw the movie version, will recall that the cargo of Captain Bligh's ill-fated ship was breadfruit trees destined for the West Indies. Traffic in plants began as soon as old-world explorers set foot on new lands, and the seeds, bulbs, and cuttings they brought home often proved to be of greater economic value than the gold they so eagerly sought. Kings, queens and other noble backers of expeditions had gardens that they treasured, and the herb doctors were always on the lookout for new plants of medicinal value.


CHRYSANTHEMUM
1. BUTTON-FLOWERED POMPON
2. OLD-FASHIONED POMPON
3. SINGLE
4. ANEMONE-FLOWERED
5. LARGE-FLOWERED POMPON
PROPAGATION
(1) Take new shoots from old clumps in April.
(2) Root the trimmed shoots in moist sand.
(3) Later, transfer to small pots holding equal parts of sand, loam, and leaf mold, and protect in a cold frame for 3 weeks.
(4) Then set 18 inches apart in permanent place.
18"
GENERAL CARE
Pinch back taller varieties when small, to promote bushier growth.
"MUMS" are excellent for cutting.
(A) This may be done when the buds show color.
(B) They will fully develop in water.
(C) Remove all submerged foliage.
Various APHIDS will attack "Mums." Control with nicotine, pyrethrum, or rotenone-soap spray
(D) Aphid enlarged.
(E) Natural size on bud.

SOME PERTINENT CHRYSANTHEMUM ADVICE FROM "THE GARDEN CLINIC" BY LAURENCE BLAIR, PUBLISHED BY THE MACMILLAN COMPANY

We know that the chrysanthemum made its début in England in 1754, but it did not become established until it was reintroduced from France in 1795. It gained rapidly in popularity during the next thirty years; in fact, it became a common flower in professional gardens and was no novelty in the windows of humble cottagers. The taste then was for double flowers, and this was true also of the chrysanthemum. All varieties then known were so tender that, even in the mild English climate, winter protection had to be provided by glass, or cold frames of some sort. Soon the hybridizers got busy, and new varieties were produced at a rate that was fairly rapid considering how little was then known of the science of plant breeding.

The chrysanthemum was first brought to the United States in 1847. It became popular almost immediately as a greenhouse flower, and people nursed it along outdoors as best they could. The varieties then in use were all late-flowering, and it is said that many a dame of that day would forego the comfort of wearing her best flannel petticoat in order to bring her treasured mums into bloom. Gardens draped in red flannel must indeed have been a colorful sight and the butt of many a rude jest. About this time the French began to bring out new varieties that bloomed early—some as early as the month of August. One M. Lebois, a leading hybridizer of the period, was bemoaning the fact that in spite of everything he did he could not make his chrysanthemums bloom before the middle of October. Then he received from the head gardener of Avignon two seedlings from which he developed nine new, early double sorts. But in this country, except for a few hardy and rather straggly varieties, the chrysanthemum did not gain general favor as a garden flower until modern plant breeders went to work on it. But in the greenhouse it became very popular about the time of the Gibson Girl, the giant pompons netting a nice profit for commercial florists. About 1900, earlier and hardier garden varieties began to come in from French originators. However, even these were not quite early or hardy enough until American hybridizers began to experiment with them.

Foremost among the great modern chrysanthemum breeders are the names of Alex Cumming of Bristol, Connecticut; Elmer D. Smith of Adrian, Michigan; Charles Totty of Madison, New Jersey; and Eugene H. Michel of the old Dreer firm in Philadelphia. Probably Colonel Cumming of Bristol Nurseries leads them all, but he modestly defers to the others in his own book, *Hardy Chrysanthemums,* published in 1939. He bows especially to the veteran Elmer D. Smith.

In order to produce varieties suited to American gardens of the North, it was necessary to go back to the Orient and introduce some of the original wild blood. It was Alex Cumming who found just the right strain in the native Korean chrysanthemum, *Chrysanthemum coreanum.* From this white, daisy-like species came the hardiness that has created an entirely new race of Korean hybrids.

The growing of the modern hardy chrysanthemums is so easy that, once established, many gardeners are inclined to let them run wild. They can be started from cuttings that are rooted in spring or summer; grown from divisions of old plants in the spring; or raised from seed. Old clumps should always be torn apart every spring, using the new shoots, that spread in all directions, and discarding the worn-out central section. Propagation by this method will soon fill all available space with the desirable varieties. If not divided up, they will keep on blooming but will become straggly, and some of the choicer varie-

PHOTOGRAPH FROM J. HORACE MCFARLAND

TWO ATTRACTIVE AND INTERESTING CHRYSANTHEMUMS. AT THE LEFT IS ACACIA, AND AT THE RIGHT IS AUTUMN LIGHT

ties may be crowded out. Cuttings can be made from the hardened growth of the current season, and these will root easily in boxes of moist sand, or even in the open ground. This is the way commercial growers propagate plants for sale, or for forcing for the autumn or winter flower trade. Pots should be used if you plan to have them bloom for you indoors.

Some years ago I was attracted by an offer of chrysanthemum seed of the "cascade" type. I bought a packet of this seed and from it grew perhaps a dozen plants, all singles of the daisy type, ranging from white to yellow and red. These are late bloomers, waiting for frost to open up; but they are such charming flowers in the late October or November garden that we do not mind their tardy habits. Just what they are, I have never been sure, but they evidently have Korean blood in them. They are rather floppy, unless staked, but in a rock garden or along a stone wall that does not matter. A better strain of seed would have produced better plants, no doubt, but these are so satisfactory in their simple, naive way that I have never discarded them in favor of newer, more refined varieties. I have some of the better named varieties too, including the so-called "azalea-mum", or cushion type. These start flowering in late July or early August, and, while the flowers are not large, the profusion of bloom makes them almost a solid mass of color. The first of these was pink, but they now are available in yellow, coppery-bronze and white. The dwarf, compact habit of these cushion mums makes them desirable for the low border, although they are not as good for cutting or display purposes as some of the taller types with more distinctive and showier flowers.

The older double types are still much in demand; in fact, are better for cutting than the singles. Korean strains of these are now available, thus enabling gardeners who prefer doubles to have earliness too. It would be futile in a non-technical article to list all the leading varieties, or even the various types. Anyone interested should attend a chrysanthemum show, or, better still, visit a greenhouse or nursery where a representative group is being grown. To do so will give one a profound respect for the amazing variety and range of this colorful plant and for the enterprise of the creators of the modern chrysanthemum.

The very names of the newer mums suggest Oriental origin, and at the same time conjure up visions of magical charm. Such are Mandarin, The Moor, Indian Summer, Romany, Ember, King Midas, Caliph, Pale Moon, Autumn Lights, Goblin and Gleam O'Gold. Most of these happen to be Bristol Nursery creations, but they are typical of the feeling that has inspired so many plant breeders to devote precious years to chrysanthemum improvement.

Another interesting addition to the chrysanthemum family is the group known as Northland Daisies. The first of these was a pink hybrid of *Chrysanthemum arcticum,* the Arctic daisy of northern Europe. It was found in the garden of Mr. and Mrs. J. Franklin Styer of Concords-

PHOTOGRAPH FROM J. HORACE MCFARLAND

PALE MOON—A TRULY LOVELY CHRYSANTHEMUM

PHOTOGRAPH FROM J. HORACE MCFARLAND

LAVENDER LADY—A DOUBLE KOREAN HYBRID

ville, Pennsylvania, and whether it was a natural cross or a mutation (sport) is not known, but the flower, which is a lovely soft pink with a prominent yellow center, is produced in profusion on a plant that is dense, free and very hardy. It is named Astrid, and there are now a number of others in the Northland tribe, all singles, with colors ranging from white to yellow and rose.

Mums are not at all fussy—at least the hardy garden sorts are not—but they do demand plenty of sunshine, air to breathe, and some space around them. Almost any well-drained soil will do. If the soil is kept loose and open, is reasonably well fertilized, and is not allowed to become too dry, they will make a good growth during the summer. When early autumn comes, a shot of liquid manure, nitrate of soda, or a good complete fertilizer will wake them up and get them in shape to bloom.

Pinching of the new wood is advisable to encourage bushiness and to increase the number of flowers. This can be done when the plant is 6 to 9 inches high or even later.

Chrysanthemums are not particularly susceptible to insect attacks, but if seriously invaded by beetles or other biting bugs, arsenate of lead will stop them. They are much more likely to be attacked by red spiders or plant lice, which are not difficult to control with Black Leaf 40, or one of the other vegetable poison sprays. Dusting with sulphur will keep down diseases and discourage insects.

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My Jewels

By HARRY E. WILDER

Not gems from the far places, bought in the busy marts,
Tainted by slavish toil and moil, or broken human hearts;
But the burnished gold of the sunset, crowning the closing day,
And the silver sheen of the river, winding its distant way;
The dew-drop diamonds sparkling in the rays of the morning sun;
The myriad star-points gleaming in the dome when day is done;
The glistening snow-flake crystals, of infinite shape and form;
The ice-pearls opalescent, that follow the winter storm;
The floral wealth of the springtime, when cold and frost have fled;
The emerald fields around us, the turquoise sky o'erhead;
The fiery ruby flashing from the hummer in his flight;
The flame of fire-flies legion, lighting the summer night;
Such are my treasured jewels, each one a precious thing,
Be it sun-burst over a sapphire sea, or glint of beetle's wing.
No place for shining pebbles, bought in the busy mart—
Just these, and my lovèd ones' faces, in the setting of my heart.

To use this map hold it before you in a vertical position and turn it until the direction of the compass that you wish to face is at the bottom. Then below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. It will not be necessary to turn the map if the direction faced is south.

MERCURY TRANSITS SUN

By ISABEL M. LEWIS

On the eleventh of November an unusual phenomenon will take place in the heavens. The planet Mercury, as it passes from east to west of the sun in its orbit, will go directly across the face of the sun, instead of north or south of it, as is its usual way. So, what is known as a "transit of Mercury" will occur. It will take about five hours and five minutes for the planet to make the transit, and during this time the sun will set in all parts of the United States with Mercury still on its disk. In Alaska, Hawaii, the Philippines, and all parts of the Pacific, the entire transit will be visible. In South America, except in the extreme eastern part, the first part of the transit will be seen, as in Central America and the United States, the sun setting with the planet projected on its disk.

So uncommon an occurrence is a transit of Mercury that there will be only eight more after this one in the present century. All transits of Mercury must occur near the dates when the planet passes through its nodes, or the points of intersection of its orbit with that of the earth, on May 7 and November 9. November transits are twice as frequent in occurrence as May transits because in November the planet is much nearer to the sun than it is in May and the limit within which transits are possible is much larger. The interval of time between successive November transits may be as short as seven years, although usually it is thirteen years. May transits can never occur at closer intervals than thirteen years. After an interval of forty-six years a transit is almost certain to repeat at the same node. The last transit of Mercury was partial, or grazing, only a part of the planet's disk encroaching upon the solar disk. It occurred on May 11, 1937, and observations of its phases were obtained both in South Africa and in Indo-China. The next transit of Mercury, also visible in the United States, will occur on November 14, 1953, and the only other transits of the present

century visible after that date will be on May 5, 1957; November 7, 1960; May 9, 1970; November 10, 1973; November 13, 1986; November 6, 1993, and possibly a grazing transit on November 15, 1999.

It is not possible to see Mercury when it is crossing the disk of the sun without the aid of a telescope, although even the smallest will show it. The size of its disk at time of transit as compared to that of the sun will be about as 1 to 200, about the size of a small sunspot. Any telescope that will show small sunspots will show the planet in transit. The first phase of the phenomenon will be "first contact", when the advancing edge of the disk of Mercury is tangent to, or first touches, the disk of the sun. By means of the spectroscope it may be possible to see the planet projected against the dense lower atmosphere of the sun before it is in contact with its disk. Shortly after first contact the disk of the planet should be seen indenting the limb of the sun. In this transit of Mercury the point of first contact will be nearly due east on the sun's limb. Second contact will occur when the planet's disk is seen fully projected against the solar disk, with a thin line of light visible between the edge of the sun and the disk of Mercury. The interval between first and second contact will be about one and eight-tenths minutes. In the eastern states first contact will occur at about 3:49 P.M., November 11, Eastern Time; an hour earlier in Central Time; two hours earlier in Mountain Time; three hours earlier in Pacific Time. The third contact, when the planet is last seen completely outlined against the solar disk, and fourth contact, when it has completely disappeared from the disk of the sun, but is still tangent to it, will occur after the sun has set in the United States.

Observations of the times of the second and third contacts in a transit of Mercury are of considerable astronomical value. The times of first and fourth contact are, of course, not directly observable because the planet's disk cannot be seen until it is actually visible against the solar disk, and that will be at a time *after first contact,* at the beginning of the transit, and *before fourth contact,* at its end. At the coming transit third contact will not be observable in the United States as it occurs after sunset, but it may be observed in Alaska, Australia, New Zealand, and elsewhere in the Pacific. The time of second contact will be observable, however, in the United States. It is not possible to predict it within a number of seconds because the tables upon which the predictions depend are not yet sufficiently accurate. That is one reason why observations of the transit are desired; to improve the tables. Such observations will also aid in solving the problem of the variability of the earth's rotation period.

Not only may the predicted time of the transit be several seconds in error, possibly as many as twenty or thirty, but it is also difficult to observe the exact time of the beginning of second contact. Skilled astronomers observing with excellent instruments at the same observatory have obtained times differing more than half a minute. Differences of more than a minute may easily occur, but if a sufficiently large number of observations are made—say one hundred or more—the mean of the times may be very close to the true value. It is for this reason that the professional astronomer would like some help from the amateur astronomers in the United States. Anyone who has a small visual or photographic telescope, an accurate time piece and who knows his exact geographical position, can help. He can record accurately the time when he sees the disk of Mercury on the disk of the sun, separated from its limb only by the thinnest line of light, and thus make an astronomical observation of value. The Superintendent of the Naval Observatory has asked for just such aid in making these observations in all parts of the United States. Observers have been requested to transmit their results to the Superintendent, U. S. Naval Observatory, Washington, D. C. Mimeographed copies of Instructions for Observers have been prepared for those who expect to make observations of the transit of Mercury. Firmly-mounted telescopes at least two inches in diameter would be essential, also a time piece accurate within a second or so. The position of the observer must be given or shown on a large scale map. A solar eyepiece or dark glass should, of course, be used, and care taken to avoid any injury to the eyes. Any telescopic equipment suitable for observing or photographing sunspots would be suitable for observing the transit of Mercury, bearing in mind that the disk of Mercury will be no larger than a small sunspot and entirely invisible to the naked eye.

The planets Jupiter and Saturn are still the most interesting objects in the evening sky. Jupiter will be in opposition to the sun on November 2 at 11 P.M. Eastern Time, and Saturn on November 3 at 4 P.M. and they will be visible throughout the month close together in Aries. They are now in their most favorable position for observation, and at time of opposition will be above the horizon all night. Mercury will be in inferior conjunction with the sun when in transit on November 11. It then passes to the morning sky and will be at its greatest western elongation on November 28. It will be seen at its best in the morning sky shortly after this date for an hour or so before sunrise, although it may also be seen for a week or more before the date of its elongation.

Venus and Mars are also in the morning sky at this time. Mars is now far from the earth and no brighter than a star of second magnitude. Venus is always by far the brightest planet in the heavens and is now nearly twice as bright as Sirius, the brightest of all the stars. It is slowly drawing nearer to the sun in the morning sky and decreasing slightly in brightness. It resembles the gibbous Moon in phase at this time in the telescope. Both Mars and Venus are in Virgo. Venus is rapidly overtaking Mars and the two will be in conjunction early next month.

The annual swarm of meteors known as The Leonids will make their usual appearance on November 15-16. Conditions for observing them are not favorable this year, as the Moon is full on November 15, and bright moonlight will blot out the light of all but the brightest meteors. They will come in greatest numbers after midnight and from a northeasterly direction.

POLE TRAPS

By MYRTLE J. BROLEY

WATCHING a large brown marsh hawk feeding her four half-grown young ones we wondered where the male could be. As a rule this graceful, pearl-gray chap is an excellent provider and most attentive to his mate and young ones.

"Something must have happened to him," we decided. In a short time we discovered what had happened! A nearby field was fenced in with wire, and on top of five of the posts were nailed five deadly steel traps. Four were in readiness to catch any unwary bird. From the fifth dangled the body of a once beautiful marsh hawk.

His tightly-shut lips betraying his anger, my husband waded a shallow creek to walk along the row, springing one trap after the other. He had just finished when a lad of about fifteen came running down the field.

"Why're you setting off my crow traps?" he demanded, his breathing quickened after his run.

"Crow traps!" my husband exclaimed. "Do you catch many crows in them? There are no crows in them today."

POLE TRAPS SET TO GET THE WARY CROW CATCH MORE BIRDS THAT ARE VALUABLE ALLIES OF THE FARMER INSTEAD

At the left, the nest occupied by young marsh hawks, both of whose parents might easily become the victims of the ruthless and inexcusable traps, thus robbing the farmer of the help of these birds in keeping rats and mice in control on his land

"Not as many—" the boy stopped, looked at us then at the body of the hawk.

"Not as many as other birds, eh?" The boy nodded. "And you won't. The crow is too wary. These birds—your best friends—will get caught though, and also the useful, harmless broad-winged hawks."

The boy dug the toe of his battered shoe into the soft earth. "I don't want to catch them," he said, "but they get in. I try to let 'em out in time—"

"But usually they are crippled, eh?" The lad agreed, sadly.

"Well," my husband placed his hand on the boy's shoulder, "these pole traps are vicious things. I wish you'd stop putting them up. After all why use them when you catch four useful birds for every crow? What birds have you taken, by the way?"

"Meadow larks, short-eared owls, broad-wings and Franklin gulls," the boy counted them off on his fingers.

"And every one of them an ally of the farmer. Have you ever thought how many mice those two hawks and the owl will eat in a season, and how many different insects the meadow larks and the gulls feed on? Even the crow rids the farm of a lot of crickets, grasshoppers, and so forth."

The boy gazed soberly at us for a few minutes. Then he said, "Look, I'll take these all down. I hadn't thought of it just the way you put it."

As we walked back to the car, feeling a glow of accomplishment, we wished we could convince all the owners of farms who put up such traps to catch owls and crows of the suffering they inflict and the unnecessary and costly loss of valuable species of birds that they cause. It is sad that so much waste arises from honest ignorance or from a lack of complete understanding of the services rendered by one form of Nature's large family in keeping some other form in check and balance. Our farm boy friend, we are sure, will spread the word.

THE SCHOOL PAGE ★★★

EDITED BY DR. E. LAURENCE PALMER

Professor of Rural Education, Cornell University, and Director of Nature Education, The American Nature Association

"On de fence" in Defense

In recent issues of *Nature Magazine*, this page has taken issue with poor science editing in the movies, with poor writing of science texts and with other controversial matters. The correspondence induced by these stands would indicate that the views expressed have won favor; that we should continue to harp on the dangers of carelessness on the part of agencies likely to influence large groups of our population.

It would be fun to continue the fight because of new examples of carelessness that have developed. When in "Boom Town" Claudette and Clark discuss the smell of odorless carbon monoxide in the city streets we are inclined to hold our own noses. And when the lady in "The Sea Hawk" looks for a new "Specie" of rose in a garden years before Linnaeus developed the binomial nomenclature, we still wonder why the name of some science editor is not added to that long list of those who are responsible for each film. Somehow we think something must be wrong with our science education when none of the staff responsible for "Boom Town" knew that carbon monoxide is odorless.

But just now there are reasonable demands for constructive suggestions about what to do next. We are called upon to make an important decision at the polls; to take our part in necessary defense measures; to help formulate policies of international importance. What is the best thing for our country? Is it best to throw all resources in to meet an immediate emergency, or is it more desirable to plan a long-time program? In times of real peace, there is no question about the wisdom of the long-time policy. It is not so easy to make the right decision in times of war.

Much of our wildlife conservation work has been directed towards guaranteeing living targets for a limited proportion of our population. Little has been said about the role of game in providing a supplementary food supply. In New York State alone, in one year, the wildlife resources yielded 250 tons of delicious muskrat flesh worth twenty-five cents a pound, 150 tons of raccoon flesh worth ten cents a pound, nearly 600 tons of deer venison—to say nothing of the value as food of the flesh of 148 thousand squirrels, 24 thousand snowshoe rabbits, 42 thousand skunks, 51 thousand ducks and 210 thousand pheasants. No one can contend that a maximum production is being maintained for this source of food in this or in any other State. Eventually there must be a great demand for food from this country and we should be able to meet it for our own defense at least. To date, the wildlife groups have failed to recognize this and other roles that they might well play in national defense. Possibly some forms of wildlife may figure in the solution of this food problem.

Much of our school work has been of the academic gymnastic type. We have studied in great detail the anatomy of *Spirogyra* and the perch, but have had little time to introduce behavior studies of man as a social animal in our high school biology. The present war has been waged most effectively by playing on the weaknesses of men. These techniques might prove less effective were the victims of aggression trained to meet this sort of attack. Our school science teachers must decide now whether they are to continue their traditional programs or to take the necessary effort to develop new ones appropriate to the current problems of the country. It would seem that Nature study of the type that calls for working with living organisms of the higher orders in their natural environment might offer some help here. It is obvious that an understanding of how to make other living things do what is desired should constitute one phase of a defense program.

True, we need a great army of workers to produce the materials with which wars are fought. But we also need to prepare ourselves to meet the demands of a new population when a goodly proportion will have spent a year or more of active service directed towards defense. We cannot sit complacently back and assume that under these circumstances everything will continue to go on as it has in the past. What we need now is not regimentation of old materials that have provided our school programs, but a willingness to recognize as legitimate new materials that have now taken a new significance even though they may not have been considered as orthodox in the past. With the relegation to the scrap heap of many of the sacred cows of the present and past there will be an opportunity to create a new program and a new philosophy. This opportunity should be welcomed by many.

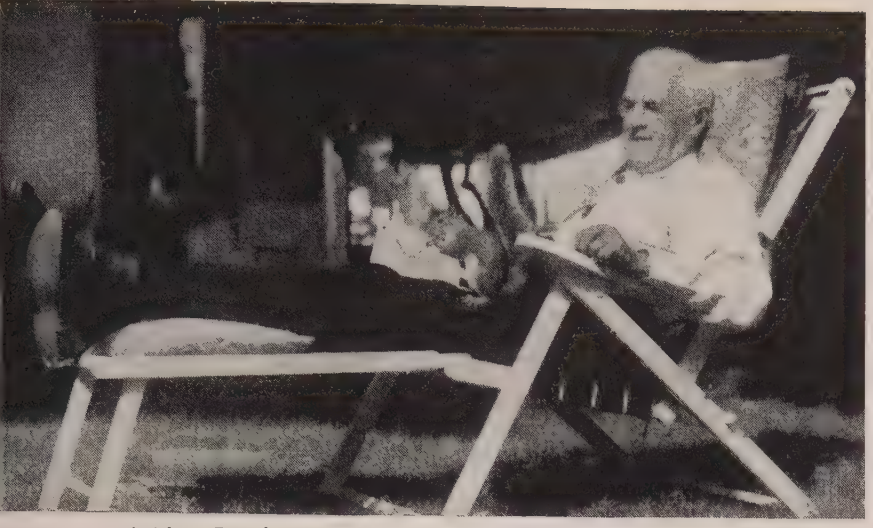
Recently an adviser of prospective science teachers boasted that he had been able to get his students, by the time they had completed their freshman year in college, well regimented for the work they presumably would do four years hence. It seems remarkable these days that anyone should presume to predict with confidence much of anything that might happen one year hence, to say nothing of what will happen in four years, let alone the wisdom of attempting to regiment an education into prospective teachers. To me it is doubtful if such a thing is ever possible. Parrots who can sing off a series of catch phrases, and can assign lessons and hear them recited, may be developed by regimentation, but will this lead to true education? And in the present, these old songs that have seen sung by many of our texts, and by more of our teachers, have lost their meaning. What will take their place? Here is an opportunity for constructive work that our present period of unrest provides. It should not be overlooked.

The study of science and of Nature is essentially the study of cause and effect. It is not the study of tradition, of ritual and rites. Our defense program must be keyed into a dynamic recognition of how to meet quickly new situations in the light of the most recent experiences of others. The fate of conservatives who sought self preservation behind a do-nothing policy should be obvious to anyone. Why we can not learn something from the experience of others seems absurd, but there are those who feel that somehow they will escape where others have fallen. True the social sciences are not so exact as the physical, biological and mathematical sciences, but there are generalizations that can be achieved with safety. Anyone trained in studying cause and effect should be able to read the handwriting on the wall. If there is any lesson in this for teachers of Nature study and science it is centered on the desirability of strengthening confidence in the validity of cause and effect experiences as contrasted with the worth of hearsay and hand-me-down knowledge.

There is, of course, grave danger that in a great preparedness movement we overlook factors that have an indirect bearing on defense because of the obvious value of guns, planes and ships. Nevertheless the human organism cannot work effectively at top speed all of the time. Where the speed and amount of work done are accelerated, as it is at the present, it is important that wholesome recreations be provided for the essential periods of relaxation. Free time is dangerous if it is abused, as it frequently was in the last World War. The military experience will provide travel for many of our young men. It should provide them with guidance in print and in personal leadership to the end that they may make the most of this opportunity. I know of soldiers and sailors in the last war who had hobbies of making bird pictures, of collecting sea shells, of making mineral collections and even of collecting seeds in the different places to which their duties took them. In private life, these men could not have afforded the travel that made it possible for them to enrich their collections. These wholesome activities made it possible for them really to profit by free time. Isn't it an obligation of the government to provide opportunity for wise use of leisure by those whose time they draft, as well as to provide them with a program specifically aimed at a mastery of the details of military defense?

These hobbies may well lead to worthwhile discoveries bearing on our natural resources. They will not in most cases spring into being without stimulus. Schools that train these men before they enter their period of military training would do well to do more than they have in the past to encourage Nature hobbies among them. Something of the sort is being done at Dartmouth, and this year similar ventures are beginning in a few other colleges. The high schools definitely have an obligation here that, for the most part, they have not recognized in the past.

The biggest danger associated with a defense program, of course, lies in the ruthless spirit with which those in authority may despoil a region of its natural resources. The timber and wildlife that a region may value may be destroyed at the whim of men who do not appreciate their worth. Conservation activities calling for long-time programs may be abandoned because they are not appreciated. Adult and child education may continue along the hum-drum lines that have been sufficient in the past but may not be so now. Manpower enlisted for specific military purposes may or may not be guided to usefulness in other fields. These are but a few of the fences from which we will have to get down in our new defense program. We will go one way or the other. Let us hope that wise decisions will be made by those in authority.



A New Reader

In sending the photograph reproduced above, Mr. Franklin Henshaw, manager of the water department of the Village of Scarsdale, Westchester County, New York, makes the following brief comment: "You can see from the enclosed photograph that even the squirrels read your magazine." We were almost tempted to add, pridefully and in the vernacular, "It's the nuts," but we won't. Thank you, Mr. Henshaw, and we hope you enjoy it, too.

PHOTOGRAPHIC NOTES

(Continued from page 499)

Have you begun your Christmas cards yet? It's none too soon, especially if you plan many of them or wish to use an odd-sized paper or envelope. If you delay too long, your dealer may not have the supplies you need.

Develochrome, the toning developer made by the Fink-Roselieve Company of 109 West 54th Street, New York City, is worth trying. With it you can develop your prints directly in almost any color of the rainbow, and by developing partly in black and white developer and the rest in Develochrome those pleasing off-black effects are easy. The colors are permanent, and are as brilliant or as soft as you wish to have them. Slides developed or toned in the new material are excellent. If your dealer does not carry Develochrome, write to the makers and mention Camera Trails.

Agfa Ansco has begun to supply infra-red film in most of the popular roll film sizes. Infra-red lets us make many pictures that are not possible with any other negative material, and its use is simple in practically any camera.

Burke and James, Inc., makers of the popular Solar enlargers and distributors of photographic apparatus, have brought out a new booklet entitled "Better Pictures." It is almost a short course in photography. It gives lighting, lens, and camera data for many types of shots, and miscellaneous information you will find valuable. Although this booklet is priced at fifty cents, the Burke and James Company have supplied Camera Trails with a limited number of copies for free distribution. Write to this department for your copy.

Photographers who make portraits will be interested in the Hampden Make-up Kit that retails for $1.50. The foundation, lip rouge, and shadow colors are in stick form and are much easier and less messy to apply. Write to the Hampden Sales Company, 251 Fifth Avenue, New York City, for details.

The Alfen Specialty Company of 307 Fifth Avenue, New York City, makes a number of accessories you will find interesting. Among them are a celluloid dodger for enlarging control and a series of masks for use in Christmas and other greeting cards. Write to the above address for their catalog and be sure to mention Camera Trails.

The Fotoshop, 18 East 42nd Street, New York City, has issued its Fall Almanac-Catalog. It contains, in addition to the catalog, a digest of many of the year's more important magazine articles, and hints on the purchase of equipment. The catalog is priced at twenty-five cents, or is free with purchases of $2 or more.

Movie makers will want to see the Magazine Ciné-Kodak Eight, the 8 mm camera that uses film in magazines that are so arranged that the photographer can remove and replace the film without losing a single frame when he wishes to change from black and white to color film, or from one type of film to another. Eastman has made many splendid movie cameras, but this one is tops.

Camera Trails is your department, and your criticisms and suggestions are appreciated. If you need help with your photographic problems, do not hesitate to call upon the Camera Trails service for it. Address your letters to Norris W. Harkness, Nature Magazine, 1214 Sixteenth Street N. W., Washington, D. C.

Audubon Yearbook

For eighteen years the Indiana Audubon Society has brought out a year book devoted to bird life and its conservation. It contains bird experiences, censuses and observations by members and most of its contents are of interest to friends of birds anywhere. The 1940 issue of the year book is dedicated to the late W. S. Blatchley, naturalist and scholar, who passed away last May. Copies of this 100-page issue are available at one dollar from Miss Margaret Umbach, secretary of the Society, 2526 East Drive, Fort Wayne, Indiana.

With this new Kodak 35, you focus simply, swiftly, surely. Looking through the range finder window, you see your subject split in two, horizontally . . . the lower half pushed to the right (see *A* above)—or to the left (*B*). A turn of the focusing knob brings both halves of your picture together (*C*)—and you're in exact focus for a beautifully sharp picture.

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NATURE IN PRINT

As a convenience to readers the books reviewed in the pages of Nature Magazine may be ordered through the book department of the American Nature Association, 1214 16th St., Washington, D. C.

(Continued from page 503)

earlier books, but there is an unique interest in *The Wandering Lake,* Lop-nor, fed by the rivers Konche-daria and Kum-daria, somewhat east of Eastern Turkestan. Three other lakes, says Hedin, have played momentous parts in his life. "But," he continues, "more deeply than any of these three has Lop-nor, 'the wandering lake,' entered into my life and by the force of circumstances been linked with my destinies. Forty-one years have passed since I first pitched my tent on its shores, and three years since I listened for the last time to the whispering of the spring wind in its reeds and, as I have described in this book, navigated the northern part of it in a canoe. And through all the years which lie between these two dates I have followed the pulse-beats of the river Tarim and Lop-nor as a doctor examines a patient's heart and circulation." Writing like this certainly lures away the dullness from geography!

More than fifteen centuries ago the lake Lop-nor, Sven Hedin concluded years ago, had occupied a distant lake bed since dried into desert, and in 1900 Hedin prophesied that Lop-nor would again return to its faraway and ancient bed. In 1928 the tributary stream changed its course, the prophecy come true, and in 1934 Sven Hedin returned and again explored these waters. *The Wandering Lake* is his fascinating report on these travels and on the studies that revealed this geographic wonder to him, the writing accompanied by the author's own pen and ink sketches.

Audubon's America at first thought seems a far cry from Hedin's *Wandering Lake,* but the similarities have at least the interest of coincidents. Both men were traversing wilderness areas, although of a different sort; both were scientists and artists, though science was paramount for the one and art for the other; and, most important of all at the moment, both were gifted writers. Publication of *Audubon's America* is an event of outstanding importance, for with all the honor paid to Audubon his writings have not been read nearly as much as they should be for our own benefit and pleasure. We have been reading more and more about Audubon and less and less of his own writings. Fortunately Mr. Peattie's volume provides an opportunity to correct our sense of proportion, a biographical essay for an hour's reading, a few minutes now and then of introductory notes, and a long week-end of Audubon's own accounts of birds, mammals, people, wilderness, and travel, illustrated as it should be with faithful and large-size reproductions of Audubon's paintings. But no mere week-end book, this is a volume for the library for frequent enjoyment and profitable browsing.

I am sure that when one has finished *Audubon's America,* he will have first of all the impression that he has been on a long travel. As Peattie points out, Audubon "saw almost everything, from 1803 to 1849, from Florida to Labrador, from New York City to Fort Union on the borders of Montana," and what is more he described what he saw in narratives that are vivid and exciting. The natural history writings are not slighted in this volume, which includes the "biographies" of the turkey, whooping crane, Carolina parrot, and ivory-billed woodpecker, accounts of four mammals, and the narrative on the eggers of Labrador, but these have only what Mr. Peattie believes is a reasonable proportion of the whole. "That whole," he says, "is the America of his day, America as he, and perhaps only he, knew it. Audubon's America."

New Zealand, the Gaspé Coast, and the desert waters of Asia we still have, and we can wish as we read the travelers' tales of these regions that we ourselves were actually doing the traveling. Audubon's America has gone, and we can enjoy his graphic, invaluable record of it with the knowledge that we are doing this traveling in the only possible way, though fortunately we can still share many of his delights: *"Friday Novemb' 3rd 1820 . . .* The *Indian Summer* that extraordinary Phenomenon of North America, is now in all its Splendor."

About Carl Akeley

Anyone who has visited the Akeley African Hall at the American Museum of Natural History, or thrilled to the amazing habitat groups in other leading museums, is witnessing something that is, in fact, a memorial to the late Carl Akeley. Naturalist, explorer, artist, sculptor, inventor—all these titles, and more, could be given to Mr. Akeley. How he earned such titles may be found in *The Wilderness Lives Again* by Mary L. Jobe Akeley. This is not precisely a biography, yet it is the story of Carl Akeley, and of his work, and of his influence upon museum progress in America. The story takes the reader to Africa on safari; behind the scenes in the museum where the results of collecting expeditions were organized for presentation in dramatic fashion. It is exciting with its descriptions of adventures in the wild, and is equally so in its detail of the problems that were met and surmounted. Published by Dodd, Mead and Company, Mrs. Akeley's book is priced at three dollars.

Life Elsewhere

Does this war-strewn planet of ours sustain the only life in the universe? This is a question that has intrigued man for many centuries and continues to intrigue him. Astronomy has, of course, pushed the boundaries of the universe outward from this Earth of ours and has developed fact and theory about other worlds. In *Life on Other Worlds,* H. Spencer Jones, British astronomer has summarized the evidence, and the methods by which it has been obtained, and presents his conclusions. With these conclusions he does not expect all to agree, but he does bulwark them with astronomical fact. This is a book that will interest anyone with at least a fairly competent amateur interest and background in astronomy, since it is popular in treatment. Published by Macmillan, the book sells for three dollars.

Unresting Cells

In his forewords to *Unresting Cells* Arthur H. Compton says: "The most valuable thing in the world is life, and the most valuable life is that of man. If we accept these propositions, what is more important in gaining an appreciation of our place in the world than trying to understand what life is? It is this formidable and entrancing problem which is the theme of *Unresting Cells".* This is, indeed, a provocative subject, and Ralph W. Gerard of the University of Chicago has treated it in this book in a manner that will interest, inform and inspire the intelligent adult. Published by Harper and Brothers, this significant book sells for $3.75.

Food Plants

Most recent leaflet in the fine popular series issued from time to time by the Field Museum of Natural History in Chicago is entitled *The Story of Food Plants.* The author is B. E. Dahlgren, Chief Curator of the Department of Botany at the Museum. The bulletin is illustrated by pictures of the new murals that tell a picture story of food plant history. This bulletin is Number 25 in the series of Botany leaflets, and is available from the Field Museum of Natural History, Grant Park, Chicago, Illinois, at twenty-five cents.

Columbia River Fisheries

The History and Development of the Fisheries of the Columbia River comes from the Government Printing Office as Bulletin 32 of the United States Bureau of Fisheries, now merged into the Fish and Wildlife Service of the Department of the Interior. It is the work of Joseph A. Craig and Robert L. Hacker, and the title is descriptive of the contents of this report. Copies are available from the Superintendent of Documents, Washington, D. C., at twenty cents.

Brief Review . .

FUR, FEATHERS AND STEEL: OF FEATHERS, HACKLES, FISHHOOKS AND OTHER MATERIAL USED IN TYING TROUT FLIES. By Reuben R. Cross. New York: Dodd, Mead & Company. 1940. 78 pp., illustrated. $2.

An expert tells how to fashion flies for trout fishing and how to select the material. He dedicates his volume "To Those Anglers Who Never Became So Engrossed in Their Art of Casting and Killing Trout That They Cannot Pause to Listen to the Song of a Warbler or Admire the Beauty of a Delicate Wild Flower."

Field Museum Murals

A series of seventeen large and colorful mural paintings, illustrating methods of food plant cultivation, and emphasizing the economic and social aspects of the husbandry and distribution of agricultural products, has been installed on the walls of the Hall of Food Plants at the Field Museum of Natural History in Chicago. They are the work of Julius Moessel, Chicago artist, and were prepared under the technical direction of B. E. Dahlgren, curator of botany at the Museum.

PLAYING INDIAN

(Continued from page 535)

or other convenient support, and small flakes may be pressed from the edge until the desired shape is obtained. If the stone is of proper texture these flakes may extend one-half to three-quarters of an inch across the flat face of the stone. With stone of poorer quality the flakes will be small and it will be found difficult to thin the blank.

Bone is probably the best for a tool, and was commonly used by the Indians. However, it wears rapidly and a steel point will be found satisfactory. The point of a small three-cornered file is good, or, for smaller pieces, a horse-shoe nail. To show it could be done I have made a number of fair points with only my auto key for a tool, using blanks, or thin pieces of stone, picked up in the fields. Of course other shapes are as easily made as arrowpoints and one may make diamonds, hearts, crosses, or even images of birds and animals.

Simply Insects

"This book is intended for people who want a little information about common insects, presented in language that anyone can understand. Here is the information that most concerns an ordinary citizen, with all the technicalities left out. The insects are called by their common names. With the aid of good pictures, something is told of what they are like, and where they are found and what they do in the world."

So says James G. Needham in his valuable little book, *Introducing Insects*. It is subtitled "A Book for Beginners", and that is an accurate description. It should be of interest and value to many who may be appalled or discouraged by more monumental works. Insects, of all natural forms, live most intimately with man—more often than not to his displeasure—yet the average individual is woefully ignorant of them. Dr. Needham, in this little book, offers a means of remedying that situation. Published by the Jaques Cattell Press, Lancaster, Pa., the book sells for $1.50.

Drawing Dogs

Diana Thorne needs no introduction to the readers of Nature Magazine, who have enjoyed many of her charming and understanding drawings of dogs. Now they have an opportunity to discover how she does it; how she gets the effective poses that she does. In a little book entitled *Drawing Dogs* Miss Thorne tells all, and illustrates the book profusely with proofs of her artistry and keen knowledge of the dog mind. Published by The Studio Publications at one dollar, this is a charming book for any dog lover.

The Rock Book

This is the title that Carroll Lane Fenton and Mildred Adams Fenton give to a volume that will answer every demand for a popular, authoritative and usable book on rocks and minerals. Illustrated by five pages in full color, forty-eight pages of photographs and forty line drawings, the text is admirably supplemented, making the Fentons' work an outstanding identification volume. Carroll Lane Fenton has already proved himself a geologist who can write about his subject both fascinatingly and informatively. This felicity of treatment is to be found in this volume, in the authorship of which he is joined by Mrs. Fenton. The result of their collaboration will be welcomed in school and public libraries and in every home where an interest in rocks and minerals exists. Published by Doubleday, Doran and Company as one of their Nature Library volumes, this book sells for six dollars.

Whitefoot

The Tale of the Whitefoot Mouse is one of the most delightful books for young people to come our way recently. It is the story of the life of this little dweller of field and wood told with beautiful pictures and brief, simple text. Both are by Henry B. Kane, who sought his subjects in the wild, photographed them there and carefully observed the small drama of their existence. This is one of the Borzoi Books for Young People in the series of "Wild World Tales", published by Alfred A. Knopf, at $1.25. If you are casting about for a Christmas gift for a youngster, ten or under, this would answer your problem.

Garden Encyclopaedia

The Home Gardening Encyclopaedia by Walter Brett is an interesting and useful volume full of practical gardening advice. Written by an eminent British horticulturist, it is, of course, prepared for an English audience and deals with growing conditions and garden problems as they are found in the British Isles. In some minor respects this would impair the volume for a general American audience, but in the main the information applies equally well to the northeastern quarter of the United States. Published in this country by The Chemical Publishing Company, New York, the book is worth the $2.50 price.

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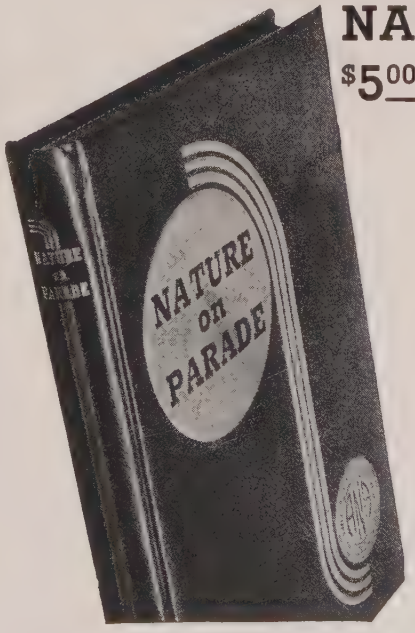

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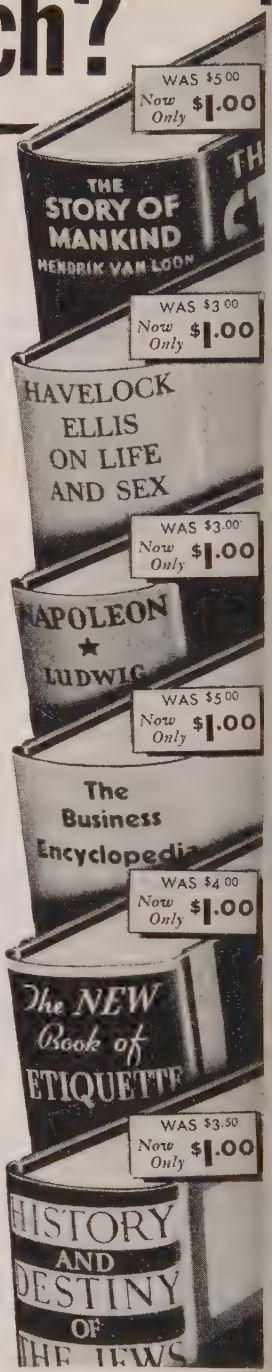

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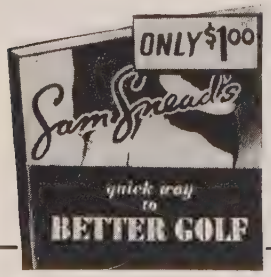

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MUDDY MARGES

(Continued from page 507)

black-bellied or whistling plover. A party of them upon some incurving strand or scattered over the nearby shoreland marks the day indelibly. *"Tee-u-ree,"* they cry, *"teer-eer, tee-ee,"* sprinting along by the rippling water.

Two stunt fliers from the ranks dash away, return, twist, wheel, bank, and whirl in startling evolutions, speeding at last toward a narrow, distant point thrusting far out into the irregular silvery sheet.

Sometimes a dispute at table amid the straggling beach company leads to stiff-winged, slanting passages at one another by a pair of fast-footed gladiators who turn swiftly to meet or narrowly miss again.

The rising clamor of wild geese betokens their departure from the marge we follow; the lifting of lesser waterfowl in massed divisions signals our advance. Distantly swan-necked grebe, ruddy duck, pintail, teal, mallard, and merganser ride warily. A raft of coots skitter away with the commotion and splash of a retiring side-wheeler. Then a great blue heron leaves like a liner gathering way and is soon "hull down" beyond the point. Ring-billed gulls, massed whitely upon islanded rocks, screaming, rise and circle. A clarioning squad of gray geese reconnoiter overhead. Like them, though not a part of migration's pageant, we too are going. But to whatever margin we may follow, from whatever shore we may drift, memories will call us back unfailing to these wave-washed, muddy marges.

A RETIRED HERO

(Continued from page 520)

without hurting it. After all, it had not bitten me yet.

I ran back to where my bicycle lay, one pedal in the air, and lit the lamp. My plan was to enclose the captive in the cap and tie it with the inevitable piece of string that always lives in small boys' pockets. The plan was all right, but half way through the process the inevitable accident occurred. I was trembling with excitement—anyhow, I was trembling—and before I could fix the trap a large and very wet toad fell out, and all I had left was a large and somewhat decayed backbone of a smoked haddock and a few black beetles. I knew all about toads and burying beetles, and I now remembered that elderly fishbones become phosphorescent, although I had never before caught them doing it. The toad had been burrowing under the deceased fish, collecting the undertakers—as we called them in those days before we knew that they were really morticians.

The mystery was solved; I blushed alone! That is why I never told anybody about it. And let me remark that heroism is not all it is cracked up to be. Sometimes you may get a gold star to wear on your bosom forever, and people nudge one another when you go by whispering "There he is!" But if you do your stuff the least bit wrong you are apt to have nothing but a shameful memory—without ribbons on it. I was so modest that I was determined it would never be a subject to be nudged about. I retired into my accustomed obscurity and concealed the exploit for fifty years. I only reveal it now on account of my biography—if somebody should decide to write one—and because I need the money. And I don't care who knows it.

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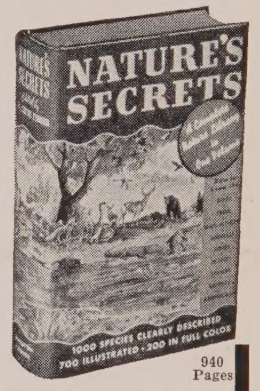

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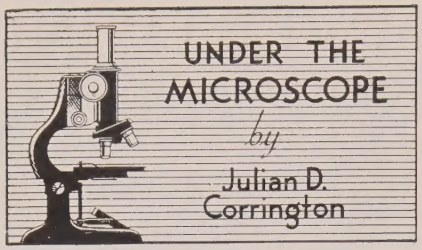


Polarized Light

Drawings courtesy of the Polarizing Instrument Company

A complete understanding of the phenomenon known as polarization of light is complex and difficult, leading one into the rarified domain of advanced optics. However, for the needs of the general amateur, the biologist, and all others save the specialist in optics or crystallography, a satisfactory working idea may be gained by the use of simple diagrams and homely comparisons.

One trouble that confronts us at the outset is that no one yet understands fully the nature of light itself. The best explanation that will fit all of the known facts, including polarization, conceives light as electromagnetic vibrations in an all-pervading elastic medium, the ether. The unit particles of light, or photons, vibrate at such an enormous speed that the waves they propagate travel at the prodigious rate of 186,284 miles per second and proceed away from a source in all directions and in straight lines.

The particles themselves do not advance any more than do the particles of a rope that is shaken or the cork that bobs up and down on the crests of ocean waves, but the energy is translated outward in all directions, as happens to the quiet waters of the pond into which one drops a stone. Thus far, this concept of light is perfectly understandable, although staggering the imagination in trying to grasp a mental picture of such a speed.

But now the physicist gives us a really tough nut. He says that not only does a single light ray vibrate at right angles to the longitudinal pathway of the wave, but that it does so in all directions at once! This seemingly preposterous condition—diagrammed by the radiating spokes in figure 1—reminds one of the old gag about the cavalry officer who sprang to his horse and rode off in all directions at once.

Conrad Beck, in his masterly little volume on the microscope, suggests that an ether particle may oscillate along first one spoke and then another, and that it traverses an infinite number of such spokes in so short a time as to produce effects as if it were moving along all the spokes simultaneously. A ray of ordinary light of this sort is unpolarized, and remains unchanged in this respect while traversing a pane of glass, or resins, most liquids, and transparent crystals of the isometric system, such as a crystal of common salt. All of these objects are termed optically inactive or isotropic (equal-turning).

When, on the other hand, a light ray enters a crystal of calcite of the variety termed Iceland spar, it is split into two rays, which are refracted at different angles and polarized. Instead of the particles oscillating in every perpendicular to the path of the ray, they do so in one plane only. Furthermore, the two resultant rays are polarized at right angles to each other so that, let us say, the particles of one are vibrating vertically, and of the other horizontally (figure 1). Bodies that have this capacity of splitting a light ray in two and polarizing the two resultant rays are termed optically active, doubly refracting, birefringent or anisotropic (not isotropic), and include a great many chemical and mineral crystals and such organic substances as fibers, starches, bone, horn, hair and muscle.

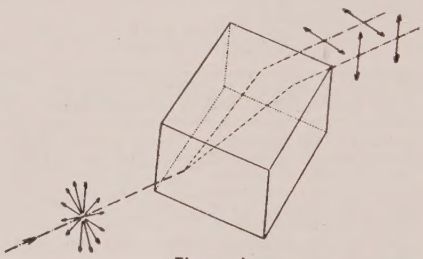


Figure 1

Polarization is caused by a particular arrangement of the molecules composing such a substance. Beck compares the structure of an isotropic body with a regiment of soldiers, each man representing a molecule. When lined up so that every soldier in one rank is six feet from his neighbor on either side, and the various ranks six feet apart in depth, the formation is isometric; but if in each rank the men were to close up so that they were only one foot apart, yet the ranks remained six feet distant, then the formation would be anisometric.

Another picture for the mind is to think of the anisotropic arrangement as a series of optical slots and to compare with the shaking of a rope that passes through a large comb (figure 2). One may shake the rope up and down, crosswise, or along any diagonal, but the only waves that can get through are those parallel with the teeth of the comb. An optically active substance has its molecules arranged like the anisometric deployment of soldiers, forming ultramicroscopic optical slots that filter out the vibrations along all diagonal planes; vibrations may pass lengthwise between files of soldiers and crosswise between ranks, but not diagonally; hence a light ray entering such a substance is polarized and vibrations are restricted to two planes at right angles to each other. Further, since the molecular particles are denser than air, they exert a retarding effect on the speed of the ray, resulting in a bending or refraction; and since the particles are more densely spaced in one direction than in the other, the amount of retardation is different in the two planes and hence the ray is split into two, each refracted to a different amount.

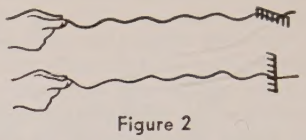
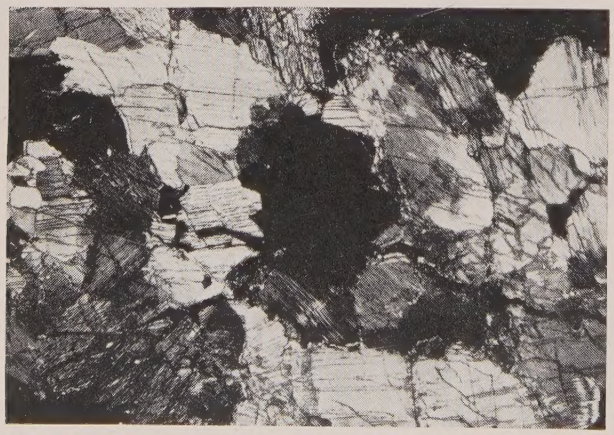


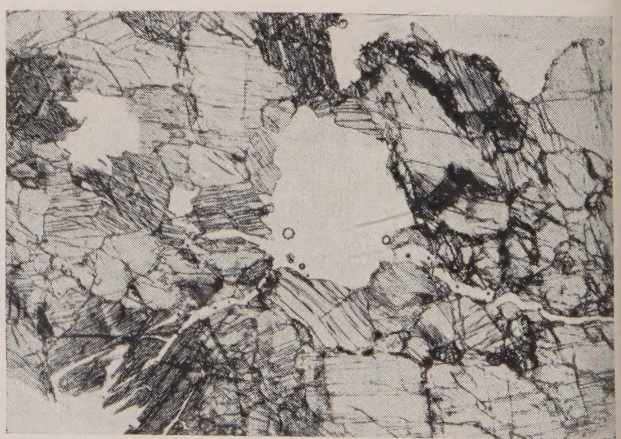
Figure 2

Light is polarized in Nature by reflection from polished surfaces, such as glass; by the scattering effect caused by minute particles, as when sunlight is scattered by dust in the atmosphere, or in passing through a liquid in which minute particles are suspended; and by certain crystals. In order for man to use polarized light he must devise some method of getting rid of one of the two resultant rays, thus permitting observations of materials by the light of the one remaining ray, and an instrument equipped for this work is termed a polariscope. If hooked up with magnifying lenses, it is a polarizing microscope. Two methods have been discovered for the production of a single polarized ray.

The first of these was invented by Nicol, who cut a calcite crystal in two along a diagonal, then cemented the cut halves together again with balsam. Such an appliance is called a Nicol prism and is still the most perfect of known means of polarizing light. An incident ray of ordinary light is split into two components that are refracted unequally. One of these strikes the diagonal layer of balsam at such an angle that it is reflected out of the side of the prism and lost, while the other ray is refracted less, passes through the balsam, and continues on to emerge from the prism as a single polarized ray, and is available in studying polarized light itself, or the effect of this light on other substances.

The second method uses a crystal that will absorb one of the polarized rays and transmit the other, as happens with the mineral tourmaline. Crystals having this property are





TWO PHOTOGRAPHS OF THIN SECTIONS OF THE MINERAL, PYROXENITE. THE LEFT PICTURE IS BY POLARIZED LIGHT, THE RIGHT BY ORDINARY LIGHT. SLIDES COURTESY OF WARD'S NATURAL SCIENCE ESTABLISHMENT

termed dichroic, but unfortunately few of them are sufficiently transparent, while tourmaline is always tinged with some color. However, in 1852, Herapath discovered that the sulphate of iodoquinine is strongly dichroic and polarizing, and this mineral was subsequently named herapathite. This is the substance employed in recent years for the manufacture of thin sheet products under the trade name Polaroid. Ultramicroscopic crystals of herapathite are set in a film while the latter is still semi-fluid and by a process of rolling are oriented in parallel directions, the average deviation from a perfect alignment being about one degree. The girth diameter of an average individual crystal is of the order of one wavelength of light, and they are so numerous and closely packed that a piece of film shows no visible structure even under a magnification of 1100X.

This film will polarize the entire visible spectrum as well as the infrared and ultraviolet, and the results are said by most workers to be almost the equal of those with a Nicol prism and entirely satisfactory for at least all routine or usual studies. Polaroid has the great advantage of its film form, capable of being made in large sheets and of being cut into any desired size or shape, mounted between glass discs if preferred, and far cheaper than the small and costly Nicols. This new invention has made polarized light available for all microscopists—even the boy with his inexpensive miniature microscope—and has introduced many new and undreamed of uses—as glare-eliminating spectacles and auto headlights, stereoscopic motion pictures, and still others. Doubtless many additional applications will be discovered shortly. A diagram of the polarization of light by this film is shown in figure 3.

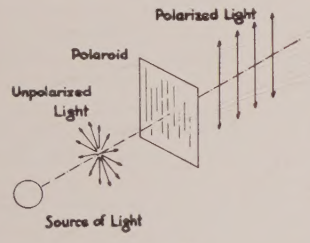


Figure 3

In science, polarized light is employed to render clearer a multitude of minute objects scarcely visible at all by unpolarized light; to determine the nature and structure of many classes of materials, thus permitting identification and classification, as in determinative mineralogy and crystallography and chemical analysis; and to detect strain and imperfections, as in a sheet of glass. Using a modified form of polariscope called a saccharimeter, the physician determines the quantity of sugar in urine—of great importance in diagnosis—while the entertainment value alone of polarized light is likewise worthy of mention, gorgeous colors and effects being produced that never fail to intrigue the student of Nature's wonders.

In use, two polarizing elements are necessary, the first being termed the polarizer and the second the analyzer. The polarizer is located between light source and object, the second between object and observer. One of the two must be capable of rotation, and generally it is the analyzer from the standpoint of convenience. In the polarizing microscope, one Nicol prism or polaroid disc is mounted below the stage, or condenser, the other above the objective, either in the objective casing, the tube, the eyepiece, or on top of the latter. This form, called a cap analyzer is the simplest and most usual arrangement. Chemical and mineralogical

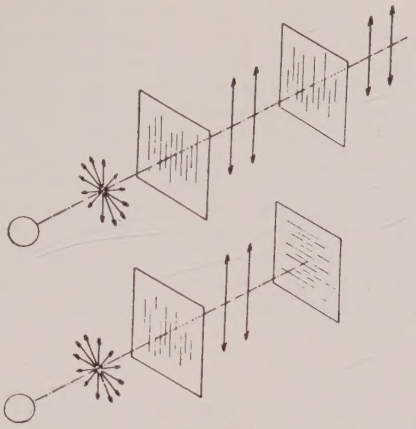


Figure 4

microscopes come equipped with Nicol prisms for this work, but either Nicols or polaroids may be added to any standard instrument, or polaroid films or discs used with miniature stands.

As explained by figure 4, the polarizer or first element polarizes the ordinary incident light from the microscope mirror. If the analyzer is rotated so that its optical slots are parallel with those of the polarizer, the light will continue through without further change. Looking at an object through the microscope arranged in this manner one sees apparently regulation white light and observes nothing unusual save that the light is dimmer, since one of the two resultant rays into which the polarizer split the incident beam has been deflected (Nicol prism) or absorbed (polaroid disc).

When the analyzer is rotated through an arc of 90°, however, the polarizing planes of the two elements are at right angles; the elements are said to be crossed. The light passed by the polarizer, vibrating vertically (for example) cannot get through the horizontal structure of the analyzer. Accordingly it is extinguished and the field appears perfectly dark. In between these two extremes a certain amount of light gets through and gives various shades of dimness.

Now if an optically active substance is placed on the stage of the microscope, between these two elements, the polarized ray emerging from the polarizer is again polarized by the material—in two directions, as is always the case with this phenomenon—and some of these rays reach the analyzer and are once more polarized, some passing to the eye. Because rays in one plane are retarded more than those in the other at each polarization, there will be some that happen to be retarded one-half wavelength. These will interfere with unretarded rays and cancel out, resulting in darkness; crests of one wave coinciding with troughs of another kill the wave motion. It is as if two people were trying to oscillate the same rope from the two ends at the same time, one pulling up while the other pushes down, with opposite effects, resulting in no wave motion of the rope at all.

Since white light consists of all the spectral colors, each with a different wavelength, cancellation of some of these components means that the light seen by the eye will always be colored, and the effect produced by different objects is truly gorgeous. Four times during each complete revolution of the analyzer—once for every 90°—the vibration

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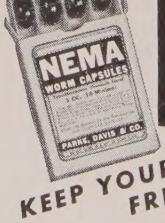

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directions of the material under observation will coincide with those of the crossed polarizing elements and the light will be extinguished. The angles at which extinction occurs differ for the various crystal systems and when measured on the scale with which some analyzers are equipped, afford a means of identification. The whole matter is more complicated than indicated in this brief description, but enough has been given to show the general nature of work with polarized light.

Objects especially suited for these demonstrations include a large list of chemical crystals among which the fatty acids are most spectacular. Make a permanent mount of such an acid as spermacetic, palmitic, margaric or stearic, then warm the slide gently until the material melts and mount for observation of recrystallization during cooling. The process is notably wonderful for throwing on a screen with a simple micro-projector or for the taking of colored motion pictures with Kodachrome.

Observe various selenites, microscopic gems in fluid, isolated quartz crystals, thin flakes of talc, crushed granite particles and thin sections of agate, granite, gneiss, schist and other rocks and minerals. Study potato and tousles-mois starches, cotton and linen fibers, cellophane, inulin crystals as seen in a section of dandelion root, hairs from leaves of deutzia or alyssum, sections of bone, tooth, nail, horn, chitin, tongue muscle, fish scales, whalebone, radula of a snail, anchors and plates of Synapta. Whole mounts of the last-named, as well as fingernail, hair, chitin, eel skin, shark skin, porcupine quill, silken cocoons and of young oysters floating in fluid are all well known objects for viewing by polarized light.

Psychopathic Department

Fix the tissue for twelve light years in a mixture of fifteen parts by volume of trinitrotoluene, five parts by weight of Goddard's drops, ninety-five parts by inductive philosophy of thoroughly decalcified chicken livers, and three parts by George of what have you in your vest pocket?

Stir, heat, and massage constantly with a geologic hammer every ten minutes. Filter. Rosetta Stone (3333 B.C.) recommends the addition of a pinch of snuff, but this is not a cogent desideratum. Refilter. Distill the supernatant effluvium.

Section by the Montesorri method, run the sections down on the elevator to the mezzanine floor and stain with How Red the Rose, counterstain with one of the St. Louis Blues, dehydrate in distilled water, clear in tomorrow's weather forecast, and mount with excessive caution, especially if the horse is not thoroughly broken.

Most people have heard of cells and understand that the bodies of plants and animals are composed of these building blocks. What is not so generally known, save by those who have been exposed to some advanced biology, is that a relatively large part of the bodies of higher plants and animals is made up not of cells themselves but of cell products. Bone, for example, contains bone cells that secrete an organic matrix or ground substance, in which is deposited an inorganic substance, lime, or calcium carbonate. The bone cells themselves are insignificant in quantity or the space occupied, though all important in their function of bone manufacture.

Trade Notes

Add to your list of sources the Evans' Biological Supply Company, P. O. Box 1656, St. Petersburg, Florida. This new organization has been formed by two people—Bill Evans and his wife—who have frequently contributed articles and pictures to Nature Magazine and are well known as naturalists and scientists. They specialize in living and preserved plant and animal materials for both the general biology course and the private collector or museum, notably in echinoderms, crustacea, insects, fishes and reptiles of Florida and tropical America. Prices are attractive and premiums given on all orders of more than $5.00. If interested, write them for a copy of their catalog.

Chemistry and Medicine is the title of a volume of papers edited by Maurice Visscher and presented at the fiftieth anniversary of the founding of the Medical School of the University of Minnesota. The scientific program for the occasion was organized around the theme: Some Trends in Medical Progress with Particular Reference to Chemistry in Medicine, and the book consists of fourteen separate and fully illustrated papers by as many noted authors. Here one can read of the new control of thrombosis by injections of heparin, the mode of action of sulfanilamide, the biology of animal viruses, the latest facts discovered concerning immunity, vitamins, fats in the diet, nervous reactions and other equally important contributions. This is a must item for those of our readers who are physicians or medical, chemical or biological students, and a desirable addition to the library of any educated person who wishes to keep abreast of scientific developments. Pp. vii, 296; figs. 77; tables; references. The University of Minnesota Press, Minneapolis, $4.50.

Bausch & Lomb have just issued a new catalog of *Medical Microscopes* featuring a selection of instruments with triple nosepiece, oil immersion lens and built-in mechanical stage, as specified by nearly all medical colleges for their entering students. This is the finest type of microscope for all biological uses short of advanced research and will appeal to all of our readers who wish a high class outfit for serious work. The 12-page booklet is well illustrated and has a most attractive cover made up of a large number of photomicrographs of cells, tissues and parasites, incidentally comprising a good test of one's biological knowledge in trying to identify each picture. To secure a copy, send a 3c stamp to Julian D. Corrington, Nature Magazine, 1214 Sixteenth St., N.W., Washington, D. C., and request B & L Medical Microscopes, 1940.

A seventh edition of Bundy's well-known *Anatomy and Physiology* has appeared, the revision and editing by S. Dana Weeder, and the publication form being most modern and attractive. Many chapters have been completely rewritten and enlarged and new illustrations added, yet the general plan of the book, long admired as splendidly organized, remains the same. Starting with a background on cells and tissues, the volume proceeds with an adequate treatment of each organ system in turn, and concludes with a review presenting the systems topographically, and with excellent tables, glossary and index. Recommended for the beginning college course and for the general reader who wishes thorough coverage of human anatomy and physiology yet without the exhaustively detailed treatment required in medical courses. Clearly and concisely written, with very interesting notes and digressions on diseased and abnormal conditions and on the relations of structure and function of the body to the routine events of everyday life. Pp. ix, 490; figs. 283. The Blakiston Co., 1012 Walnut St., Philadelphia, $2.75.

A. S. A. M. News and Notes

Two new Chapters of our Society make their bow with this issue; Epsilon is the Indianapolis Chapter, while Zeta is located at Edmonton, Alberta, Canada, and bears the name of that city. Fred L. Miller, the organizer, is first president of the Indianapolis group, which elected H. Merrill Underwood, 1215 Markwood Avenue, as secretary. The Edmonton Chapter, our first Canadian as well as our farthest-north association, was established through the efforts of Wilfred R. Settle, 12603 Stony Plain Road, and has already an active membership of advanced workers. Members residing in or near either of these two localities should get in touch with the officers named.

Meanwhile many other groups are proceeding with chapter formation. Among those not heretofore listed are the Utah Chapter at Salt Lake City, inquiries for which should be made to Ernest J. Roscoe, 2364 South Ninth East; Tring, Alberta, David H. Harrington; Lowell, Mass., Stephen Speronis, 121 Powell St.; Manhattan, New York City, Henry Franklin, 1344 Lynn Place; San Francisco area, T. S. Carley, 111 Fairlawn Drive, Berkeley; Buffalo, N. Y., John H. Small, 234 Tacoma Ave.; Milwaukee, Wis., Earl Silber, 3019 N. 45th St.; and Yountville, Calif., Walter E. Jordan, P. O. Box 483.

In Brooklyn plans for two chapters are virtually complete, one for adults, the other for juniors, both under the auspices of the Brooklyn Children's Museum, for which Cornelius Denslow is supervisor of Nature projects. Adequate facilities and instruction will be provided, offering exceptionally fine opportunities for all residents of this Borough, which has the largest membership in the A.S.A.M. of any city.

Following the autumn opening of schools and colleges a number of chapters are scheduled for installation, to function as school or department microscope clubs. All teachers interested in such a splendid extracurricular activity should communicate with Dr. Corrington to secure full details.

For our next several Bulletins we have the promise of a number of exceptionally fine and scholarly articles written by experts. Each issue seems destined to surpass those that have gone before as to contents, style and composition work, and we appear to be building up a nationwide reputation as the most progressive and rapidly-growing organization in the science field today.

Librarians take notice: the time is approaching when you will be asked for copies of the Bulletin of the American Society of Amateur Microscopists. Early issues will soon be out of print. Subscribe now in order to obtain a complete file.